Jaakko Kekäläinen

Improving Quality and Delivery Times by Supplier Evaluation

Case: Kyrö Distillery

School of Technology and Innovations
Master's Thesis in Industrial Management
Master of Science in Economics and Business Administration

Vaasa 2021

VAASAN YLIOPISTO
Tekniikan ja Innovaatiojohtamisen Yksikkö
Tekijä: Jaakko Kekäläinen
Tutkielman Nimi: Improving Quality and Delivery Times by Supplier Evaluation : Case: Kyrö Distillery
Tutkinto: Kauppatieteiden maisteri
Oppiaine: Tuotantotalous
Työn Ohjaaja: Tutkijatohtori Emmanuel Ndzibah
Valmistumisvuosi: 2021 **Sivumäärä:** 84

TIIVISTELMÄ:
Toimittajien arviointi on prosessi läpinäkyvyyden lisäämiseksi ja toimittajasuhteiden parantamiseksi hankkivan yrityksen näkökulmasta. Yrityksen toimittajatietokannan syvempi ymmärtäminen antaa käsityksen toimittajien nykytilanteesta ja siitä, onko toimittajien toiminnassa parantamisen varaa. Toimittajia voidaan kehittää suoraan hankkivan yrityksen avulla tai vaihtaa paremmin suoriutuviin toimittajiin. Toimittajatietokannan analysointi on keskeinen osa toimitusketjun hallintaa ja toimii siten keskeisenä tutkimusalueena tässä tutkimuksessa.

Tämä opinnäytetyö on tapaustutkimus Kyrö Distillerylle ja sen tavoitteena on parantaa toimittajien arviointia ja kehittämisprosessia yrityksessä. Tutkimusongelma on seuraava: Kuinka toimittaja-arviointi voi parantaa Kyrö Distilleryn laatua ja toimitusaikoja? Kyrö Distilleryn toimittaja-arvioinnin nykytila on esitetty. Lisäksi käsitellään mahdollisia tapoja parantaa nykytilannetta sekä tuloksia, jotka näillä parannuksilla voidaan saavuttaa. Tämän tutkimuksen tavoitteet ovat 1) Toimittajan arvioinnin toteuttamisen tunnistaminen. 2) Tunnistaa, kuinka toimittajien arvioiminen parantaa toimitusaikoja 3) Selvittää, miten toimittajien arviointi johtaa laadun parantumiseen.

Opinnäytetyön teoreettinen kehys käy laajasti läpi useita tapoja kehittää toimittajia ja arvioida toimittajatietokantaa. Monet käsitellyistä aiheista ovat toimitusketjun hallintaan liittyviä aiheita, kuten arvoketjun hallinta ja yritysten väliset toiminnot. Toimittajien arviointiprosessista käsitellään parametrien asettamisesta ja toimittajan tietojen analysoinnista tulosten tulkintaan saakka. Laatunäkökohdat on otettu laajasti huomioon sen läheisesti liittyessä aiheeseen ja samaten sen ollessa Kyrö Distilleryn ydinarvoja.

Empiirinen osuus nojaa paljon toimittajien arviointiin liittyviin teorioihin toimittajien arvioinnissa käytetyn analyysiin arviointitekijöiden osalta. Lean-työkalut muodostavat suuren osan esitetyistä mahdollisista parannuksista, ja niitä hyödynnetään myös nykytilan analysoimisessa. Tässä tutkimuksessa käytetty metodologia on sekalainen, ja suurin osa analyyseihin kerätystä datasta saadaan kyselyillä ja haastattelututkimuksilla. Keskeisiä havaintoja olivat tapausyrityksen toimittajien arvioinnin nykytila ja vaihtoehdot sen parantamiseen toimittajien kehittämisellä joko suoraan tai epäsuorasti. Lisäksi löydettiin tehokas tapa suorittaa toimittajien arviointi ja prosessi sen ympärillä. Nämä parannukset vahvistavat Kyrö Distilleryn toimittajakantaa ja lisäävät avoimuutta sekä tehokkuutta yrityksen ja toimittajien välisessä yhteistyössä.

AVAINSANAT: Supplier Evaluation, Supply Chain Management, Total Quality Management, Lean Six Sigma, Kyrö Distillery

UNIVERSITY OF VAASA
School of Technology and Innovations
Author: Jaakko Kekäläinen
Topic of the Thesis: Improving Quality and Delivery Times by Supplier Evaluation : Case: Kyrö Distillery
Degree: Master of Science in Economics and Business Administration
Major: Industrial Management
Supervisor: Assistant Professor Emmanuel Ndzibah
Year of Completion: 2021 **Sivumäärä:** 84

ABSTRACT:
Supplier evaluation is a process for increasing transparency and improving supplier relationships from the procuring company's view. A deeper understanding of the company's supplier database gives out insights into the current situation among suppliers and whether there is any room for improvement. Suppliers can be developed directly with the help of the procuring company or changed to better-performing suppliers. Analyzing supplier databases is a crucial part of supply chain management and thus acts as a key area of investigation in this research.

This thesis is a case study for Kyrö Distillery and its aim is to improve the supplier evaluation and development process in the company. The research problem is as follows: How can supplier evaluation improve the quality and delivery times for Kyrö Distillery? The current state of Kyrö Distillery's supplier evaluation is presented. Also, possible ways of improving the current situation, as well as the results that can be achieved by these improvements, are discussed. Objectives for this study are 1) Identifying the execution of supplier evaluation. 2) Identifying how supplier evaluation enhances delivery times. 3) Establishing, how supplier evaluation leads to improving quality.

The theoretical framework of this thesis extensively goes through multiple ways of supplier development and ways of evaluating the supplier base. A lot of the discussed subjects are Supply Chain Management related topics, such as Value Chain Management and business-to-business functions. Process of supplier evaluation is discussed from setting the parameters and analyzing supplier data, ending up to the interpretation of the results. Quality aspects are widely covered for their relation to the subject, as well as them being core values in Kyrö Distillery.

The empirical part lies a lot on supplier evaluation-related theories in setting the factors for supplier evaluation analysis. Lean tools form a big part in the possible improvements presented and are also executed in the analysis of the current state. The Methodology used in this research is mixed, and most of the data gathered for the analyzes is obtained with surveys and interviews. Core findings were the current state of the case company's supplier evaluation and improvement options by supplier development either directly, or indirectly. Also, an effective way of executing supplier evaluation and the process for it was found and discussed. These improvements will strengthen Kyrö Distillery's supplier base and create transparency, along with efficiency in cooperation between the company and its suppliers.

KEYWORDS: Supplier Evaluation, Supply Chain Management, Total Quality Management, Lean Six Sigma, Kyrö Distillery

Contents

Figures

Tables

Abbreviations

ASL	Approved Supplier List
B2B	Business-to-Business
B2C	Business-to-Customer
CBA	Cost-Benefit Analysis

CEA	Cost-Effectiveness Analysis
DMAIC	Define Measure Analyze Improve Control
EFQM	European Foundation for Quality Management
EMS	Environmental Management System
ERP	Enterprise Resource Planning
ISO 9001	Quality Management Standard
ISO 14001	Environmental Management Standard
LSS	Lean Six Sigma
MBNQA	Malcom Baldrige National Quality Award
MRP	Material Requirements Planning
OTD	On-Time Delivery
PDCA	Plan Do Check Act
SCM	Supply Chain Management
TQM	Total Quality Management

1 Introduction

Selecting and evaluating suppliers is not something to be disregarded, if the aim is to build a sustainable, competitive, and especially lucrative business. Easiest or cheapest option is usually not the best one, or even the most inexpensive, when everything is considered (Harris, C. & Harris, R., 2015). This research aims to give a thorough and profound picture of improving delivery times and quality by supplier evaluation. This thesis was commissioned by Kyrö Distillery.

1.1 Background of the Thesis

Evaluating suppliers is an important part of building a strong foundation and a working business model for a company. Supplier performance has a direct correlation to company's quality and costs (Harris et al, 2015). Even though supplier tendering has been done in Kyrö Distillery, before conducting a procuring contract with them, the evaluation of the current suppliers has not been profoundly executed. This research aims to put the supplier data in numbers and to find out, how they are performing and if there is any room for improvement.

This thesis was conducted, because of the lack of an efficient process for supplier evaluation in Kyrö Distillery. The case company is aiming to get the best possible supplier base for their needs, in order to thrive in quality with minimal costs, which is the main reason for this topic being a topical subject for improvement. The idea for this research came up during the first interviews with Kyrö Distillery's representatives.

1.2 Research Problems and Purpose of the Research

Companies should aim for making their business model easy to conduct by getting as much efficiency as possible out of their processes. This research was done to enhance Kyrö Distillery's current processes and to find out new ways for evaluating suppliers and

strengthen the sourcing department of the company. This thesis aims for creating a new way of efficiently evaluating possible new suppliers and overseeing the current ones.

Research question for this thesis is as follows:

How can supplier evaluation improve the quality and delivery times for Kyrö Distillery?

Objectives for this study are listed as follows:

1. Identifying the execution of supplier evaluation.
2. Identifying how supplier evaluation enhances delivery times.
3. Establishing, how supplier evaluation leads to improving quality.

1.3 Research Material -and Methods

This research was conducted as an extensive literature review and execution of an empirical study containing multiple semi-structured interviews and surveys, that were filled by the company representatives. Data for the empirical part was gained from an existing database of Kyrö Distillery and from their Enterprise Resource Planning-system (ERP) in addition to the interviews and questionnaires conducted (Thomson, 2010).

The methodology of this study is strongly based on multiple Lean tools, like continuous improvement, operational excellence, and workflow analysis (Deming, 1986; Imai, 1986; Thorne, 2015). The criteria for supplier evaluation is strongly based on Carter's 10 Cs (Carter, 1995). Supplier evaluation is conducted with decision matrix analysis (Abdollah et al, 2015) These methods along with other important tools are used to give a profound and an accurate view of Kyrö Distillery's current situation in the means of supplier evaluation.

1.4 Limitations

Supplier Evaluation is limited to a few of the most important suppliers from the sourcing and procurement department's view. Supplier performance evaluation contains various aspects based on Carter's 10 Cs, like price, quality, and sustainability (Carter, 1995). The main focus is on evaluating the current supplier database, rather than the tendering process of new potential suppliers.

As a limitation for this research Supply Chain Management (SCM) will only be considered on the basis of activities from supplier to procuring company and the other way around. Kyrö Distillery is the procuring company in this thesis and most parts of the thesis will be reflected based on their processes. The main focus is on Business-to-business (B2B) transactions. Business-to-customer (B2C) point of view will be vaguely covered in this research.

A lot of focus in this thesis is on quality and various aspects around it because it is the most important factor in Kyrö Distillery's business processes. Quality of material and supplier's processes are discussed when improvement possibilities are presented for Kyrö Distillery's current ways of operating. Total Quality Management (TQM) is supported with different quality standards. (Dahlgaard, Kristensen & Kanji, 2008)

Lean Six Sigma (LSS) is discussed by explaining its purpose and introducing few useful tools for Kyrö Distillery, like Kaizen, 5-why analysis, DMAIC, and Workflow analysis. The study of LSS is limited to few tools, which are closely tied to continuous improvement and operational excellence. Executing LSS is mostly concentrated on Kyrö Distillery's internal processes and supplier cooperation, but some processes tied to end-customers are briefly discussed. (Vo, Kongar & Suárez Barraza, 2019; Braglia, Frosolini & Gallo, 2017; Smetkowska & Mrugalska, 2018; Thorne, 2015)

Kyrö Distillery as a company is discussed widely including a lot of their operations and ways of executing processes concerning supplier evaluation and purchase orders.

Inventory management is also considered in the context of sourcing and procurement. Most of the focus is left for supplier evaluation and sourcing in Kyrö Distillery, which eventually leads to the discussion of improvement possibilities inside the company. Other companies besides the case company and its suppliers are not taken into account.

1.5 Structure of the Thesis

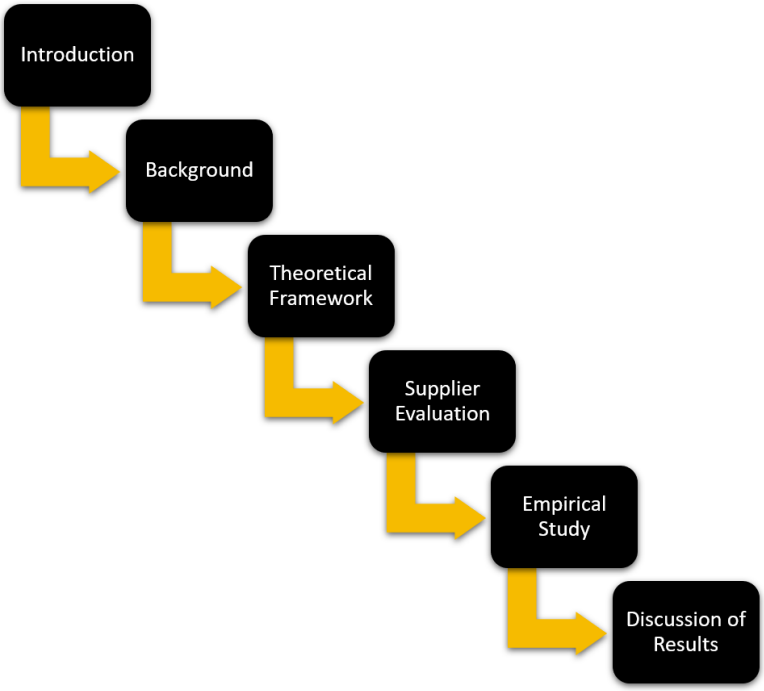


Figure 1. Structure of the Thesis.

Figure 1 shows the outline of the thesis in chronological order. After the introductory part and the background for this thesis, it is easier to continue forward by broadening the knowledge of subjects closely tied to this research in the theoretical framework. The Empirical study with the actual evaluation of Kyrö Distillery's suppliers forms the core of this thesis. After the literature review and empirical part, the results are discussed and improvement ideas are presented.

This thesis consists of five main chapters, starting from the introduction and ending up in the conclusions of the study. In the first chapter, the thesis' background, and research ´problems are introduced along with the purpose for this research. The introduction is for clearing out the structure and also limitations for the thesis and it briefly goes through some of the materials and methods used during the research. The first chapter outlines the rest of the study.

The second chapter goes through Kyrö Distillery's background. It briefly describes the case company and its current situation. Chapter two aims to give a picture of the case company's market segment and its starting points. The current state of Kyrö Distillery's supplier evaluation process and possible points for improvement are described.

Literature review stands as the third chapter in the thesis and it profoundly covers essential information about Lean and SCM, along with the main subject being supplier evaluation. Characteristics of evaluating suppliers and the framework for different supplier evaluation processes are gone through. Quality plays an important part in supplier evaluation and thus is profoundly examined through TQM. Different measures for evaluation are handled, which are implemented in the empirical part located in chapter four. (Deming, 1986; Imai, 1986)

Few of Kyrö Distillery's core suppliers are rated in chapter four, which is the empirical part of the study. A decision matrix is built for the importance factors received from different surveys. Calculations for the importance of these factors and the outcome of the analysis is handled in this chapter. The empirical work process done for this research is also explained.

The last chapter in this thesis is the conclusions. The fifth chapter explains the results more thoroughly and ties up conclusive matters obtained from the empirical part of the research. Few suggestions for improvement of current processes in Kyrö Distillery are also presented and a final summary of the thesis work is described.

2 Kyrö Distillery Background

This research is made for Kyrö Distillery and it aims to enhance the company's supplier evaluation process and furthermore create and standardized process for it. The company had a need for upgrading this process and therefore this research was conducted from the aftermath of few meetings. This part explains the background of Kyrö Distillery and the current state of the company's supplier evaluation.

2.1 Introduction of Kyrö Distillery

Kyrö Distillery Company was established in the year 2012 by five Finnish men, who became the original members and founders of the company currently known as one of the most renowned distilleries in Finland (Finder, 2020). From that point forward, Kyrö Distillery has been making its mark on distilling communities all over the world with ever-growing selection of high-end alcoholic beverages. (Kyrö Distillery, 2014a)

Kyrö Distillery is listed in the company database by the name Rye Rye Oy, but later consolidated the name Kyrö Distillery Company, which it is nowadays widely known as (Finder, 2020). As their first product, the newly founded company started distilling rye whisky, which was the original reason for establishing the company. The intermediate product, before the barrel phase and the actual completion of the whisky, gained a lot of praise and attention. Positively promising whisky was now brewing in the barrels and meanwhile, the company started making gin, which was later selected as the world's best for Gin & Tonic. (Kyrö Distillery, 2014a)

Currently, the company is making a big selection of different drinks and other products like hand sanitizer and caramel sauce (Kyrö Distillery, 2014b). In the year 2019 Kyrö Distillery Company had revenue of 4,4 million euros, so the company has grown rapidly since the founding and is currently employing 29 people. Although the company has been expanding potentially, the net operating profit has been fluctuating in recent years, due to long distilling processes and investments. (Finder, 2020)

2.2 Current State of Supplier Evaluation

The current evaluation process in Kyrö Distillery is a bit narrow. Supplier evaluation and selection do not operate with a standardized process but are more in the hands of few people. Most of the information exchanged with suppliers is done with e-mail, as well as the orders. Current suppliers are perceived as efficient enough at the moment and with this research broader and more thorough evaluation of current suppliers and the ways of improving the supplier efficiency and evaluation is done.

The timeline for supplier evaluation has not been set and thus it is not structured in the most efficient way possible. Employees in charge of different areas of production have their own suppliers, for whom they procure from. Inventory of different products are kept, because of big order batches, but this causes reduced space in manufacturing. Buffers are important for Kyrö Distillery, because of the unsure delivery of more special ingredients and items needed for production. The automation level of product orders is relatively low at the moment, even though some of the data for purchasing are generated by an ERP-system (Thomson, 2010). Information on the current state was gathered during semi-structured interviews (see appendix 4).

Tracking money transactions and orders are at the moment done vaguely. This research aims for building a stronger model for monitoring suppliers and evaluating their operations. Delivery accuracy is not registered profoundly in the current working model and order quantities are not optimized. The aim is to start tracking orders and their delivery times more profoundly, to get a wider vision of suppliers' actual performance in deliveries and quality.

3 Literature Review

In chapter 3, the theoretical side of the research will be reviewed and explained. These parts give the basis to the information and tools later on used in this research. The literature review starts from SCM and goes on to supplier evaluation. After that follows the cost and quality analysis. The theoretical part of the thesis facilitates the basis for understanding tools and methods gone through in the empirical study.

3.1 Supply Chain in Kyrö Distillery

Supply chain illustrates the whole process of getting raw material manufactured into a product and sold to an end customer. It basically illustrates the material flow from beginning to end. In between the phases in the supply chain, there are many parties involved, like the supplier making the product or producing a service and the company purchasing it from the supplier. In this theoretical framework of the research, the main emphasis is on the relationship between supplier and Kyrö Distillery, as illustrated in figure 2 below. (Harland, 1996)

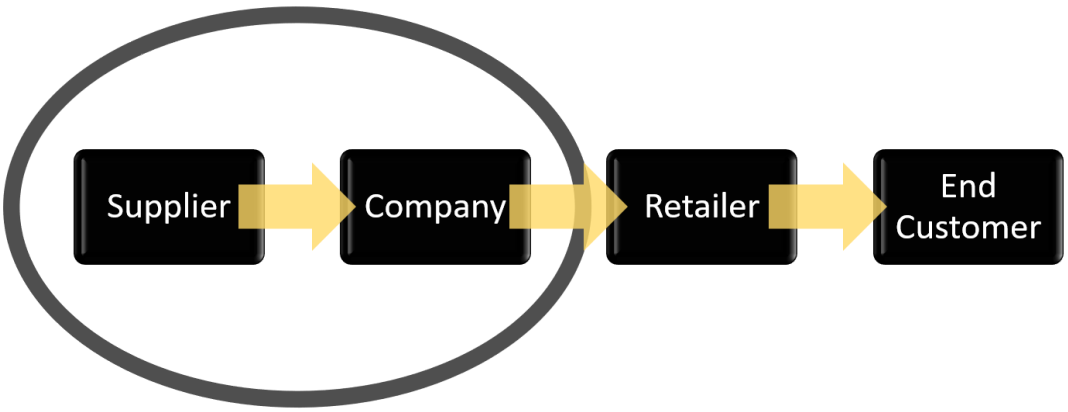


Figure 2. Example of a Supply Chain.

Figure 2 illustrates the focus of this thesis concerning the supply chain. Relationships between Kyrö Distillery and its suppliers are under inspection and the analysis concentrates on these relations between procuring company and its supplying companies. Operations concerning retailers and end customers are not seen as important in the context of supplier evaluation and thus left out of consideration.

SCM relates to all the actions done to handle production and business, but also the relationships important to the company. This goes to internal measures and activities concerning any supplier or customer in process of the whole supply chain. SCM is handling all these activities, that are included in the making of a product or doing any other type of business. All these considered, it is a relatively complex and structurally challenging part of companies' strategic and operative measures. (Tan, 2001)

SCM is the process of overlooking all of the most crucial phases in products route from raw ingredients to end customer. Basically, it covers every value-adding activity in the route of making a product or offering a service. Supply chain covers different areas of expertise and thus it may be overlooked as a whole by a person responsible, but there tend to be more people in charge of executing the broad-scaled process of SCM. (Croxton, Garcia-Dastugue, Lambert & Rogers, 2001)

3.1.1 Business-to-Business functions in Kyrö Distillery

B2B means transactional or business contracted deal between two companies. Since this research focuses on the relationship between supplying and procuring company, in this case, Kyrö Distillery and its suppliers, B2B model can be marked as the basis of the SCM conducted in this thesis. Another end of SCM is B2C which is vaguely covered in this research. (Chen, 2020)

The most usual transaction in B2B is purchasing materials or parts from the supplier, but it also indicates every purchase or trades between companies, that the producing company does. In this case, Kyrö Distillery might purchase raw-material, machinery, or

consulting services from another company. Flourishing B2B processes builds a foundation for operating excellently in the B2C field. Strong relationships between businesses lead to better quality and more resilient and efficient operating between suppliers and the procuring company. (Chen, 2020)

3.1.2 Value Chain Management

In addition to SCM, the processes and the mindset of making satisfactory products by maximizing their value to the customer is executed by value chain management (VCM). While SCM aims to optimize the process flows of supply chain to be as efficient as possible, VCM aims to achieve as much value as possible to both, customer, and the company. VCM is usually practiced broadly in companies aiming for superior quality or high-end products for customers, but in the ever-growing competitive industrial world, VCM is coming to be one of the key points in gaining competitive advantage in a specific field of business. (Tarver, 2020)

Maximizing the added value from the viewpoint of a company providing the services or manufacturing the products is more than just making a good quality product. It also contains the whole experience and the phases in buying a product as a customer. The ease and quickness of service and deliveries is also a big matter, that gives a competitive advantage over other companies in the same field of business. A clear and transparent process of company's operations also adds value to the company making to processes, like all more customer-associated value points too. Value stream flows both ways meaning that if a customer values the company's processes highly, it also adds value to the company by recognition. (Yonglin, Qiusheng & Tao, 2010)

Supporting activities in the value chain are mostly linked to the company executing the VCM. The activities are all operational measures executed by the company in question, mostly for its own good. These activities are there for enhancing the primary ones creating value for the customer. The primary activities are all the phases to get for example raw material to a finished product and delivered to a customer. The appearance of the

process of selling a product to customers is also a part of the value chain, as well as post-order services. Visually attractive marketing and products are crucial in some business fields. An example of a value chain is visualized in figure 3 below. (Yonglin et al, 2010)

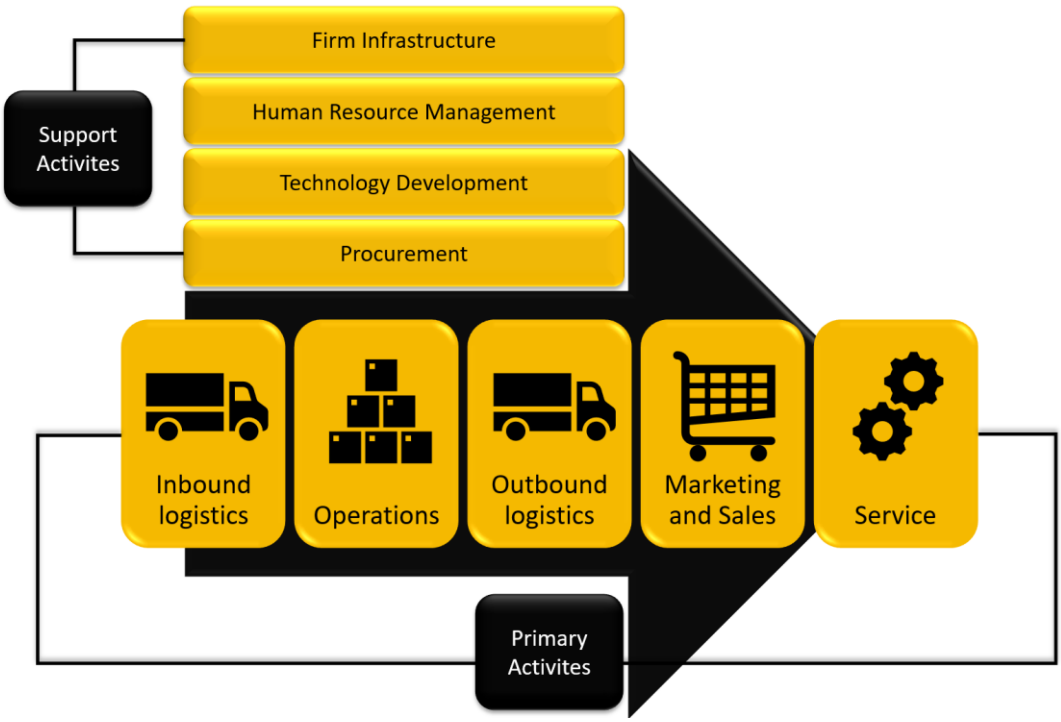


Figure 3. Value Chain. (Porter, 1985)

Figure 3 illustrates a value chain's structure and different areas that are included. The black arrow on the bottom illustrates value chain's movement starting from inbound logistics and ending to service after operations, outbound logistics, and the input given by marketing and sales departments. These are the primary activities, which build the basis and in addition, supporting activities are helping the company's operations. Infrastructural aspects with human resources, technology development, and procurement are crucial for supporting companies' value chain's primary tasks. (Yonglin et al, 2010)

3.1.3 Supplier Relationship Management

It is crucial for a business to keep good relations with the company's suppliers. Good relationships with suppliers are important for maintaining high quality in the making of

high-end products like, Kyrö Distillery. Supplier relationship management helps to thrive in this part of the SCM. Finding optimal suppliers by location, quality and cost is not a straightforward operation. If a company manages to find an optimal supplier with reference to these points, it should try to build a long-lasting and close business relationship with this supplier. This makes working with the supplying company easier and therefore usually more efficient. Close relationships do not have to apply to every supplier and it usually is better to keep more professional and solely business-minded relationships with other suppliers. (Croxton et al, 2001)

Keeping up with suppliers by monitoring orders from them and also their performance are key points for maintaining supplier performance at the desired level. Measuring on-time deliveries (OTD) is very useful, for getting concrete information about supplier performance. OTD is measured by asking for an order-specific shipping time from the supplier. They then agree on a shipping date with the procuring company. The delivery date is then calculated from this information and after the arrival of the order, it can be reflected to dates in the agreements. By maintaining this kind of order tracking system, a company can evaluate supplier performance and also discuss with them about the situation of their orders. (Eldridge, 2013)

Strategic purchasing, or sourcing department plays an important role in supplier relationship management. While the operative purchasing department handles the actual purchasing act, the strategic department handles new contracts and deals with existing suppliers and looks for potential new ones. The sourcing department's employees should pursue close and warm relationships with the suppliers by frequent communication and meetings with them. Knowing the supplier and their business thoroughly is greatly useful for the procuring company. Usually, operative purchasers know suppliers also from their area of responsibility in the company. (Lambert & Schwieterman, 2012)

3.2 Setting the Basis for Supplier Evaluation

An ever-growing need for cost savings through higher quality supplies and fast, reliable deliveries, supplier evaluation has become a crucial part of companies' operations. Due to the growing amount of supply and component manufacturers, it has become increasingly important to evaluate and consequently choose the best suppliers for companies' needs. Executing supplier evaluation effectively is a crucial point for maintaining competitive strength in today's highly competitive market. (Seth, Nemani, Pokharel & Al Sayed, 2018)

Supplier Development: Supplier development is a term for improving performance in different parts of the supply chain. Direct supplier development can be investing financially or building stronger relationships with suppliers. The procuring company can train their suppliers to improve their processes and to build stronger cooperation model for the business relationship. It can also include all sorts of assistance for instance improving the technical processes or educating suppliers in some specific field of doing business. (Yawar & Seuring, 2018)

This thesis focuses mostly on indirect supplier development, which includes supplier evaluation and tendering. Also choosing new suppliers is a part of the indirect supplier development. Enhancing company's processes is the main point of supplier development and doing so indirectly usually means replacing the poorest performing suppliers with new and hopefully better ones. Executing this kind of strategy may be more efficient, but the perks in direct supplier development are closer and longer-lasting relationships with supplier, which usually means better knowledge of each other's processes and ways of working and thus leads to easier cooperation. (Yawar & Seuring, 2018)

Evaluation Process: The main idea of supplier evaluation is to gain a broader vision of the supplier's performance. It is used for ensuring the best possible quality and delivery times through optimal supplier performance. The process of supplier evaluation sets the

framework for desired supplier quality. The optimal level of functioning must cover both, quality of products and delivery. (Sundtoft Hald & Ellegaard, 2011)

The way of executing the supplier evaluation process varies depending on the current state of the company implementing the system. Choosing the most cost-efficient and fastest way of producing, by choosing the best suppliers for example through competitive tendering is crucial in ever-growing competition in supplier markets. This is usually a relatively important factor, that companies should concentrate on, no matter the amount or current state of their supplier basis. It is common to find cheaper or better-quality options through evaluating and tendering possible suppliers. (Hill & Solt, 2010)

Supplier Database: The process of supplier evaluation usually starts with listing all the existing suppliers, if there is any to start with. The foundation for effective supplier evaluation is to keep a frequently updated list of all the suppliers currently being utilized by the company, with all the products that are purchased from these suppliers. Kyrö Distillery already has a broad selection of suppliers, which can be listed and thus the existing supplier database should be updated frequently. With this list of suppliers, all the necessary information is easily available when needed. This information could for example be stored in an ERP-system chosen by the company. (Sundtoft Hald & Ellegaard, 2011)

ERP is usually executed by specific software, which works as a tool for handling companies' operative measures. Daily activities, like tracking orders and making purchases are executed via ERP, but it is usually used by management also for tracking working time and setting different schedules. Bigger ERP-systems can be executed relatively widely to cover almost all of the company's operations, which relates to orders or materials. ERP can also be conjoined with other stakeholders besides the company in question, like suppliers. (Thomson, 2010)

As a new company still without suppliers, the process would start by listing all the materials or parts, needed to be purchased. After finding out the need for specific materials

the next step would be to find possible suppliers in this field of interest. Benchmarking other companies in the same field is also an effective way of finding possible manufacturers to procure from. (Safa, Shahi, Haas & Hipel, 2014)

If the company in question already has its own production even partially, by manufacturing either finished products, parts, or by-products, the process of building a database for supplier evaluation starts with doing a cost-benefit analysis (CBA). The analysis is uncovered more thoroughly in chapter 3.2.1. CBA gives a broader vision of the current situation in the company. Investigating different options for components and supplies can help to come in a conclusion, whether to make most of the parts inside the company or procure them from elsewhere. (Tirkel & Rabinowitz, 2014)

Many times, it is cheaper to outsource at least some of the component production or for example assembling outside the company. This is considerably common in manufacturing industries. One thing to consider is, whether the company wants to keep something for themselves for refined quality or concealment reasons. (Tirkel & Rabinowitz, 2014)

Supplier Rating: Supplier rating helps the procuring company to get a broader view of their business partners, in this case, supplying companies. Though it is in both companies' interest to create a mutually beneficial solely business-based relationship, it is advantageous to build a solid and close long-term relationship between the two companies. This creates opportunities for specialized production and mutual benefits by the ease of working because the companies have been working together for so long, that the mutual ways of executing business are well known between both parties. It may also cause some monetary benefits, due to the small amount of work and extra costs from tendering and building a mutual business model with new companies. (Santos, Murmura & Bravi, 2019)

Having an efficient system for supplier rating gives an advantage to the procuring company to pick out the overall best suppliers and thus most likely save time and money. Rating the suppliers also gives a good look at the present situation and possible changes

needed to make to the existing supplier base. Low achieving suppliers are a risk to procuring company's business, because of possible delays, extra costs, or reputation loss cause by inefficient operating from the suppliers' side. (Santos et al, 2019)

3.2.1 Analyzing Costs

After the company's evaluation of possible maneuvers to be made, the next step is to analyze the costs of these actions to find out, whether they are profitable or not. This analyzation needs to be thorough and wide scaled, in order to get an effective outlook of the time period, when these changes are going to break even and whether it is fast and effective enough to be profitable. In this case, Kyrö Distillery could analyze the cost for, example changing a supplier and calculating when the company is going to break even from this maneuver. (Campbell & Brown, 2003)

Cost-Effectiveness Analysis: Cost-Effectiveness Analysis (CEA) is a relatively simple and fast way to calculate the given benefits of an executed process of improvement. It can be simplified by putting a monetary value on the units of effectiveness. For an example, a company could invest in a new supplier, that costs a little more than the old one but is supposed to manufacture better parts for the company's product. Then the effective unit would be the part and the cost would be the total cost of how much more the new supplier is paid for these parts. This can be put into an equation illustrated below. (Campbell & Brown, 2003)

$$Cost - Effectiveness\ Ratio = \frac{Total\ Cost}{Units\ of\ Effectiveness} \quad (1)$$

This way the CEA gives out the total cost of parts saved (Campbell & Brown, 2003). In example if total of scrapped parts would have been 50 last year and with the new supplier, the parts needed to be scrapped would be 20 this year and the new supplier costs 5000 € more per year, the equation would be as follows:

$$CEA = \frac{5000\ €}{(50 - 20)} \tag{2}$$

With this maneuver, the company would have paid 5000 € for 30 parts, that were saved. That equalizes approximately 167 € per part. The outcome depends on the total cost of a bad quality part, including time-loss, transportations, and all other possible costs in the process. As mentioned before, CEA only gives a narrow idea of the benefits gained from the change and it can be considered as a simpler version of CBA. (Campbell & Brown, 2003)

Cost-Benefit Analysis: CBA is an important appliance, whenever a company needs to evaluate the financial impact of any form of action, that will change something in the way of executing operative measures. A simplified way of explaining the analysis is to calculate the overall costs of the actions and changes to be executed in the used manner and comparing it to the benefits to be gained from this maneuver on a certain time period. CBA goes deeper into the total costs and benefits of the maneuvers to be executed and is more thorough than CEA. (Cellini & Kee, 2015)

The advantage of CBA, when compared to CEA is that CBA also includes the beneficial value of the actions being taken, to execute the project. This also makes counting the net benefits a bit harder, because of the complexity and the area of effectiveness of wide-scale projects being implemented into the company in question. Cellini and Kee (2015) have simplified counting the possible outcome of CBA into the equation visualized below.

$$Net\ Benefits = Total\ Benefits - Total\ Cost \tag{3}$$

The default value in this form of the equation is positive, but the outcome could also be accounted as net costs. Counting of a broad scaled estimate like this is a thorough process of monetizing time and taking into account many different costing variables like salaries and parts. Getting a possible monetary value of the total benefits gained from the

changes can also be a complex equation depending on the scale of the project. Usual benefits taken into account are timely and quality-associated savings. (Cellini & Kee, 2015)

3.2.2 Quality Management Standards of Kyrö Distillery

The coverage of the term quality is broadening all the time and it has not been only about products for a long time now. It also contains service, experiences processes & data for example. Because of the large number of different conceptions of quality, a lot of different standards and tools are created to help with quality management. A lot of different measurements for quality have been conducted over the years. Counting the costs and benefits of having different quality materials and products can provide useful information to the company and help them to evaluate their choices in suppliers and production. (Spacey, 2017)

Analyzing product quality eventually comes down to the actual taste and appearance of the product in the distilling industry, like Kyrö Distillery. An effective way of finding patterns of different quality alterations in products is to count defects and make a table of all the products going out from the distillery. By calculating the defects and pointing them out to the defective products, patterns of insufficient quality can be found. This way, finding the root cause of the defect is easier, by scaling it to a certain phase or area of the production. (Bakti & Kartika, 2020)

Total Quality Management: Improving quality does not only mean the act of making products with better quality. It also means making products with the same quality but reducing the number of faulty ones. This kind of process enhancing is the essence of TQM. Complaint and scrapping costs can be lowered, and thus total production costs can be lowered with TQM without necessarily investing money in the upgrading process. (Dahlgaard, Kristensen & Kanji, 2008)

Quality is directly tied to many other business areas too. Thriving quality on production and other processes usually shows in other areas too. It also saves a lot of time and money. An example, high-quality production means fewer complaints and fewer scrapped parts. Looking from the customer point of view, impressing quality usually means more market share, by the loyalty of satisfied customers. These are the kind of factors that make TQM essential for competing businesses. (Dahlgaard et al, 2008)

TQM is built from various parts, that need to work together. Clear communication forms the basis for all quality-related activity. Transparent and quick communication is the key to avoiding misinformation and thus quality defects and incorrect orders caused by it. Strong management and teamwork along with highly skillful workers lead to excelling in quality. The eight elements of TQM are visualized in figure 4 seen below. (Padhi, 2010)

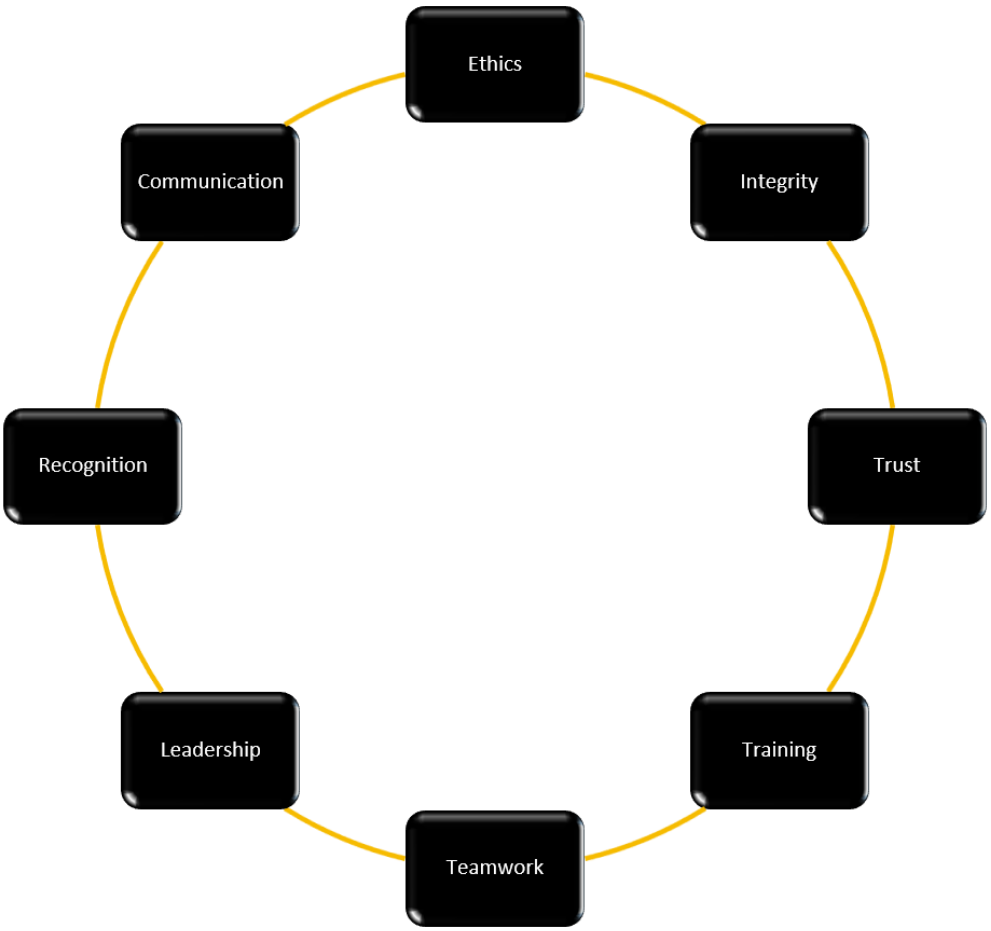


Figure 4. 8 Elements of TQM. (Padhi, 2010)

TQM elements are usually illustrated with the circular figure as seen above. TQM is a continuous process moving between these factors illustrated above. Many of these elements are also crucial in supplier, and thus need to be considered when choosing a supplier in high-quality production like Kyrö Distillery. Excelling in these factors of TQM will build a strong basis for the company's quality of operating and also product quality. (Padhi, 2010)

The most crucial points for achieving quality according to Karuppusami and Gandhinathan (2006) are longer, more strategic visions, awarding for acts towards quality, and involving stakeholders. Involving different parties in design processes is usually helpful

in a way that, the producing company gets a broader and more accurate view of the desired form of the final product. A longer perspective in the process of coordinating a company's quality measures can eventually save a lot of time and money, even though it may seem like an expensive or hard option at first. (Aquilani, Silvestri, Ruggieri & Gatti, 2017)

The concept of customer in TQM varies from the looking point of view. The end-customer using the final product is the ultimate customer for the company making the product, but also for the company's supplier, the procuring party is the customer. Focusing on customer's needs and competing on adding more value to the customer is becoming to be growingly important in a highly competitive business environment. Managing quality throughout this whole process is the main focal point of successful companies, but maintaining the level of quality is also challenging, which is the reason for implementing a TQM-system. (Aquilani et al, 2017)

ISO-Standards: Monitoring quality can be done in various ways, the most efficient ones being quality standards. Probably the most broadly known quality standards are the standards set by the International Organization for Standardization (ISO) (International Organization for Standardization, 2020a). These are the ISO-standards with the most famous one being ISO 9001. ISO-standards are made for different areas of companies' infrastructure, like Information systems, social and environmental aspects. (International Organization for Standardization, 2020b)

ISO 9001 sets the basis and requirements for quality management and is therefore closely related to TQM. The standard is really useful for gaining and maintaining a status of excelling in quality and it is also a requirement for many procuring companies in the process of choosing suppliers or doing business. Having an ISO 9001 certification relates to fine corporate culture in matters of quality and usually is a sign of high-quality products. ISO 9001 is essential for gaining a competitive advantage over other companies in

matters of quality. Kyrö Distillery's endeavor for this standard shows excellent commitment to quality. (Barafort, Mesquida & Mas, 2017)

One of the most important in customers' eyes and also one of the most popular standards amongst modern companies is ISO 14001. It is made for standardizing the required level of sustainability and minimize negative environmental effects in companies' actions. ISO 14001 helps companies to maintain and superintend their Environmental Management Systems (EMS). While environmental factors have a growingly significant importance in companies' actions and also in the minds of customers, environmental standards like ISO 14001 have become crucial for gaining competitive advantage especially in the manufacturing business. (Heras-Saizarbitoria, Boiral & Allur, 2018)

Usually, the pressure for more environmentally stable and sustainable production for companies comes from stakeholders. While companies usually want and should carry out sustainable production and usage of materials for environmentally ethical reasons, it usually benefits the company by giving out a better image to partners and customers. It is also getting more frequent to demand sustainable production and even a process standardized by ISO 14001 from the company's suppliers. Green production must be executed throughout the whole supply chain in order to execute a sustainable manufacturing process. ISO 14001 could be the next standard for Kyrö Distillery to aim for in evergrowing need for environmental, and greener decisions. (Heras-Saizarbitoria et al, 2018)

Quality Awards: Different recognitions are being awarded to companies for their excellence in different areas of quality. These awards add significant value to companies' image and also indicates excellence in quality processes. One of the most remarkable ones is an award granted by European Foundation for Quality Management (EFQM). The award is based on a model that measures companies' performance on different sectors on directing and executing various areas closely chained to the company's SCM. The model also measures factors resulting from these operations and takes stakeholders' points of view into account. (EFQM, 2020)

Aiming to finesse company's quality to a level of achieving an EFQM award is highly beneficial for reducing costs and gaining a bigger market share (Escrig-Tena, Garcia-Juan & Segarra-Ciprés, 2019). Strategic measures point out the right direction for the company by evaluating their future visions and organizational culture. The execution part of the model includes the company's actions towards customers and also factors related to sustainability and performance. Results are measured by the company's image towards customers and by performance resulting from daily maneuvers. EFQM model is illustrated in figure 5 below. (EFQM, 2020)

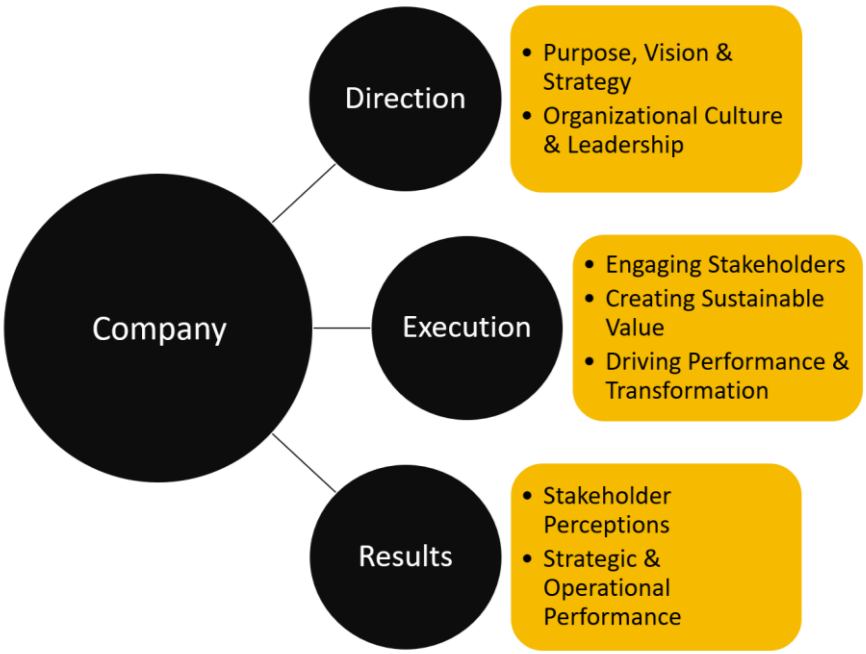


Figure 5. EFQM Model. (EFQM, 2020)

EFQM model starts from a company thriving for it and is separated into three different parts as seen in figure 5 above. Direction, execution, and results are furthermore explained in the yellow boxes. Direction forms the basis of strategic development and organizational culture. Execution is the actual measurement of processes and management of aspects regarding quality. Results are the final phase, where the stakeholder's perception and actual results of operational measures are shown. (EFQM, 2020)

Companies' motives must be towards making the production and inner processes more effective with executing successful TQM. Employee participation and cooperation between different sectors in the company are also key points for executing the EFQM model successfully. Implementing the ideology of TQM and EFQM into employees' daily actions and setting the right mindset may take some time, but rather than having a hasty change of working, it is more useful to change the company culture on part a time. (Escrig-Tena, Garcia-Juan & Segarra-Ciprés, 2019)

Big part of successful companies' effective operations is their ability to thrive on management. Enforcing and showing great leadership motivates workers and usually shows positively in the company's operations and results (Podsakoff & Podsakoff, 2019). Malcolm Baldrige National Quality Award (MBNQA) emphasizes these managerial and leadership-associated characteristics in companies. The award concentrates on evaluating strategic and societal points, as well as ethical behavior inside the company. (National Institute of Standards and Technology, 2019)

MBNQA is an award handed by the National Institute of Standards and Technology (NIST) to an organization that has excelled in the criteria closely tied to performance and management. It is only handed in the United States of America, but its framework makes it useful for example European companies too. Companies following the criteria and values set by MBNQA are more likely to flourish in their organizational quality and operations. The award oversees values tied to success, ethical aspects, and customer satisfaction, which gives a strong foundation for any company aiming for an efficient and successful business. (National Institute of Standards and Technology, 2019)

3.3 Summary of the Theoretical Ideology Around Supplier Evaluation

This final chapter of the literature review concludes the information found on supplier evaluation and presents, how it is tied to the case of Kyrö Distillery. The structural

approach as used in this research is presented in figure 6 below. It summarizes the framework from its theoretical aspects.

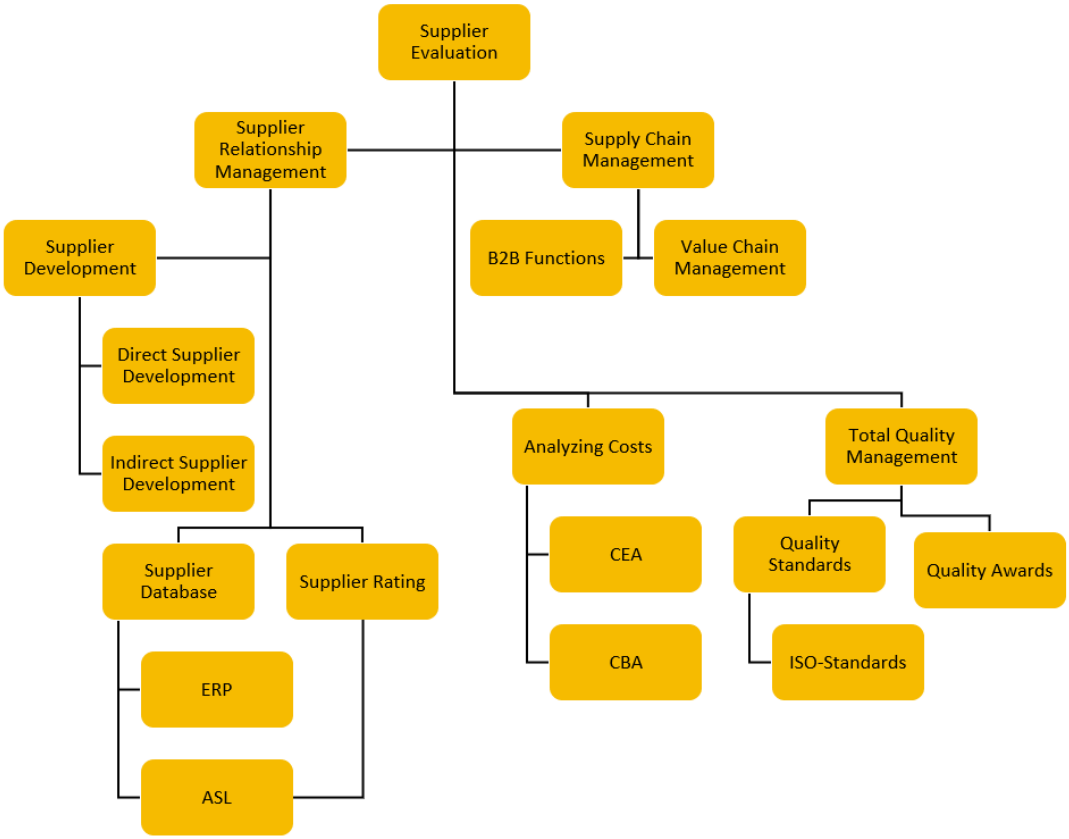


Figure 6. Summary of the Theoretical Framework.

Supplier evaluation can be inspected from different angles and it reaches a complex structure when searching its elements deeper. As figure 6 shows, supply chain management and supplier relationship management are at the start of the framework. Some of these aspects can cross each other's but are useful to figure separately on this occasion (Fuller, 2005). Supply Chain covers B2B functions and value chain management (Tarver, 2020).

Supplier relationships are the key for an efficient and reliable supplier database and thus are opened in the theoretical framework. Supplier development is separated to direct- and indirect supplier development and is utilized in enhancing the supplier base. (Yawar

& Seuring, 2018) Supplier database can be seen as the outcome of effective supplier relationship management and it is useful for keeping up with suppliers' current state of operating. ERP- systems can be utilized in building the database and the data can be exported to ASL. An updated supplier database is utilized in updating ASL as illustrated in figure 6 (Thomson, 2010; Plank & Kijewski, 1991).

CEA and CBA can be utilized in analyzing costs, which helps in setting the financial figures to the desired level, and also gives a profound look of the supplier costs of using the current ones and whether it is profitable to change them to new ones or not (Campbell & Brown, 2003). Total quality management is the last major part of supplier evaluation and it consists of the process of getting and utilizing quality standards and awards. ISO-standards are useful in maintaining quality at an excellent level, which eventually leads to bigger market portions, through better company image and less faults in production (Dahlgaard et al, 2008; International Organization for Standardization, 2020a).

4 Empirical Study

This empirical study was conducted using multiple tools of scientific research, such as semi-structured interviews and surveys. Kyrö Distillery's employees in the expertise area of sourcing and procurement filled out these forms and gave out insights for this study. This research is conducted with an inductive approach, as it started by investigating different data and creating different analyzes, which then reformed the final outcome and suggestions of change. The models constructed in the empirical part lean on both concrete data, but also a lot on the expertise of Kyrö Distillery's employees and their opinions and visions. (Saunders, Lewis & Thornhill, 2016)

Primary data collection methods in this research are surveys and interviews, but also a lot of data were gathered by observation and from the company's ERP-system (Thomson, 2010). From a strategic point of view, besides interviews and surveys, this research leaned a lot on reviewing of literature and was done as a case study with Kyrö Distillery. Multiple Lean tools are presented and harnessed based on the case company's processes. The current supplier database is reviewed and evaluated with decision matrix analysis (Abdollah et al, 2015). Factors for the matrix are conducted from Carter's 10 Cs (1995). (Saunders et al, 2016)

The methodology used in this research is mixed since there are many types of methods used combining both quantitative and qualitative approaches. The data used in the analysis part is gathered through surveys from a single point of time and thus is cross-sectional. This thesis mostly concentrates on a profound analysis of the current state in evaluating suppliers at Kyrö Distillery and discusses the ways of improving the current processes. The analysis was constructed time periodically within few months and the data available at that moment, rather than analyzing a longer period of time in the area of supplier performance. (Saunders et al, 2016)

Finally, this empirical study was conducted to further find out ways to improve quality and delivery times by supplier evaluation. It mainly focuses on Kyrö Distillery, but also

the general discussion of the subject is presented. The process starts with mapping the current situation and the most important suppliers. Also, the most valued aspects in a supplier are unraveled with multiple surveys, which are then used for the actual evaluation of Kyrö Distillery's existing suppliers. The data used in the analysis is constructed on the basis of the inner sights and expertise of Kyrö Distillery's employees in charge of sourcing and procurement. (Saunders et al, 2016)

4.1 Evaluation Factors for Kyrö Distillery's Suppliers

Ray Carter developed a useful tool for supplier selection going by the name of Carter's 10 Cs. This model is made to help companies with selecting the optimal suppliers by rating them depending on their performance on every section of the C-model. The model helps to give a strong foundation to the company's supplier evaluation and is a strong tool for the sourcing department (Carter, 1995). It was originally built around 7 Cs, but 3 more additional sections were added later on (Fuller, 2005).

4.1.1 Carter's 10 Cs

Core Measures: The first four parts of Carter's 10 Cs build the basis for supplier evaluation. First one being competency refers to suppliers being proficient and able to do tasks and fulfill orders being placed. It includes all the employees in the supplier company and the level of their competency can be observed from the quality and time of fulfilling orders. Also, from the ease of working with them and interacting professionally. (Fuller, 2005)

In the growing need of faster and more precise supply chains, many tools have been invented to refine them to the highest level of competency (Kram, Tosanovic & Hegedic, 2015). One of the tools is Carter's 10 Cs. It is focused on supplier evaluation, which is a crucial part of successful supply chain management. Capacity is the second key point in Carter's model, and it refers to suppliers' operative measures being flexible and ample enough to always secure the shipments of goods. (Fuller, 2005)

Commitment is the next one on the list to flourish as a supplier and as a company. It basically verifies, that the company has its organizational culture, what it comes to excelling in quality of production, service, and other important aspects concerning the supply chain. Showing true aspiration for high quality and executing the proper tools to do that relates to a healthy and thriving organizational culture. Commitment towards all these factors is crucial for functioning supply chain and also ensures, that the work is not done for the wrong reasons. (Carter, 1995)

Next on the scope is control, which can be reflected from the way, that company does its material requirements planning (MRP). Careful and thorough control of a company's processes through MRP can be executed with a concentrated ERP-style of managing orders and operations (Thomson, 2010). Timely knowledge about quality and delivery of product materials among with constantly updating information of inventories and ongoing orders gives a broad scaled vision about the supply chain's current operating level. (Aghazadeh, 2003)

Financial Values: Financial figures say a lot about a company's solvency and its future prospects. Thus, they are also a big part of the 10 Cs model (Carter, 1995). Cash in the model marks out the necessary financial level, where the possible supplier needs to be. Its business needs to be secured for the future, by producing enough revenue to keep the business going. Otherwise, the financial problems would spread out into the acquisitive company in a form of for example missed orders caused by lay-offs. In many cases, consulting the suppliers about their financial situation is a better alternative, than trying to find it out from the information available. (Gordon, 2005)

Choosing between suppliers, like in most of the decisions in a company, eventually comes down to costs, which is the next point in question. From a business point of view, the company always wants to choose the cheapest option. Of course, it is sensible to do so, but the cheapest option is not necessarily the one that costs the least. Supplier's total

cost comes from the amount of money it costs to the procuring company. When all the quality and time-associated costs are added to the actual product or process cost, it gets closer to the actual cost of using the company as a supplier. (Gordon, 2005)

Amongst other operational excellence values, consistency is one of the key points of keeping the quality of production persistent. Maintaining quality could be considered one of the most essential values for procuring companies and thus can be vaguely considered as a financial value in Carter's model of 10 Cs (Carter, 1995). If a supplying company can persistently produce good quality products and/or services, it relates to excellent company culture and concentration of operational excellence in its production and supply chain management. Consistent production quality also diminishes the need for complaints and accordingly sets the company for a path of thriving financially. (Yeo, 2019)

Added Values: Ray Carter (1995) later on broadened his model of 10 Cs from the initial 7, with timely and increasingly significant points. The first of the later added Cs is culture. The key point of this is to build a business network for companies with similar values. This greatly increases the ease of doing business, because of matching goals and ways of thinking. Having the same vision and strategic mindset supports the other pillars mentioned in the model and helps to keep the association efficient and lucrative. (MindTools, 2017)

Environmental factors are a rapidly growing interest in the corporate world. Many customers demand more environmentally friendly produced products with lower carbon footprint and effect on nature. This goes to procuring companies also because they cannot sell ecologically produced products if the companies producing the parts do not have ecological production. There are also environmental regulations controlling companies' actions concerning the environment. These regulations and a growing number of greener mindsets have made the clean part of Carter's (1995) model more significant. (Gurtoo & Antony, 2007)

Information and communications systems have become progressively default and necessity to developing companies. Ease and speed of communication are crucial in preventing breaks in crucial knowledge and thus operations. Mis- or lack of communication may lead to errors and fouls in operative- or strategic measures. This may eventually lead to missing orders or producing unsuitable items or services. Highly refined communication systems are highly valued between suppliers and procuring companies for these reasons. Communications is the final key point in Carter's (1995) 10 Cs. (Heshmati & Lee, 2009)

Valuing a supplier with the frame obtained from these segments mentioned, Carter's model of 10 Cs gives a profound and deep understanding of the supplier prospects. By executing all these segments successfully as a supplier, the company has an extensive foundation and is destined for succeeding. It also gives strong premises on cooperation, between procuring company and the supplier. (Carter 1995)

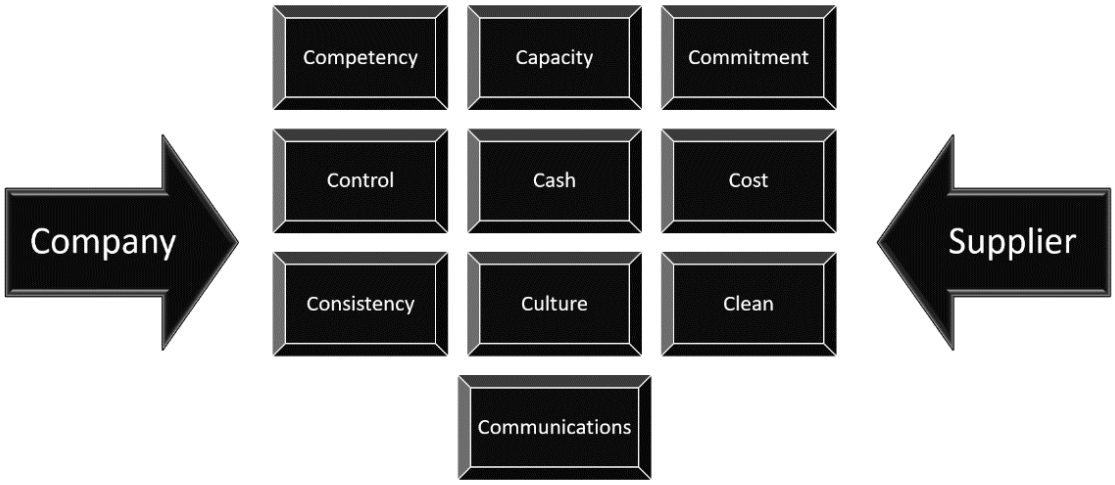


Figure 7. Carter's 10 Cs. (Carter, 1995)

Carter's 10 Cs are separated into boxes in figure 7 above. Company and supplier are the part binding these together and thus are illustrated with arrows pointing to these key values. Mutual execution of these factors between supplier and procuring company is

the core of Carter's model. Factors are not arranged by importance in this picture since they usually vary by company. (Carter, 1995)

4.2 Data Collection

Mapping the current state of Kyrö Distillery's supplier evaluation started off by constructing a questionnaire, which can be found in appendix 1**,** about the most important suppliers in different areas of the company's production. Criteria for evaluating the suppliers were also added to the same poll. These criteria were constructed on the basis of Carter's (1995) 10 Cs and interviews with Kyrö Distillery's persons in charge of sourcing and procurement. The criteria can be seen in figure 8 below.

Figure 8. Criteria for Supplier Evaluation.

Figure 8 illustrates the criteria, that were chosen to be the evaluation criteria in this particular research. These criteria are important supplier evaluation values for every company, but especially interesting and suitable in the case of Kyrö Distillery. These values form a diverse selection, which gives a profound image of supplier's overall performance based on these different areas of operating. These values reflect Kyrö Distillery's values and are important aspects of evaluation in the company's supplier base.

Data for this case was also collected via multiple interviews and distillery visits. The objective was to enhance the way of rating suppliers for Kyrö Distillery since it would help in tendering the suppliers and creating a clearer vision about the present situation with the suppliers (Hill & Solt, 2010). Surveys sent out to Kyrö Distillery's persons in charge of different areas of purchasing were constructed in two sections. The first questionnaire was about rating the factors shown in figure 8 and in the second one, the personnel were asked to rate different suppliers according to these factors. These surveys can be found in appendix 1 and 2.

4.2.1 Decision Matrix Analysis

The evaluation of Kyrö Distillery's current suppliers was done by executing an analysis using a decision matrix. Importance value was set to every criterion illustrated in figure 8, by forming a survey, which was sent to 5 different persons responsible for making orders in different areas of production. From these ratings, an average number was calculated for every criterion. These criteria evaluations set the basis for our matrix analysis. The survey can be found in appendix 1. (Abdollah, Mustafa, Shuhimi, Ismail, Amiruddin & Umehara, 2015)

Factors of Importance: Most valued factors in suppliers between Kyrö Distillery's employees were quality, consistency, reliability, and communications. Quality was the number one factor with the perfect score of 5 out of 5. Kyrö Distillery thrives for outstanding quality in their products, which came up during the interviews between Kyrö Distillery's employees. Quality is closely tied to Kyrö Distillery's company culture.

Figure 9 illustrates the spread of valuing quality, consistency, reliability, and communications in a supplier, between Kyrö Distillery's employees. These four criteria were the most valued ones and in the pictures. Percentage of different votes are shown on the pie charts sections. The color codes of different ratings are shown right of the circles.

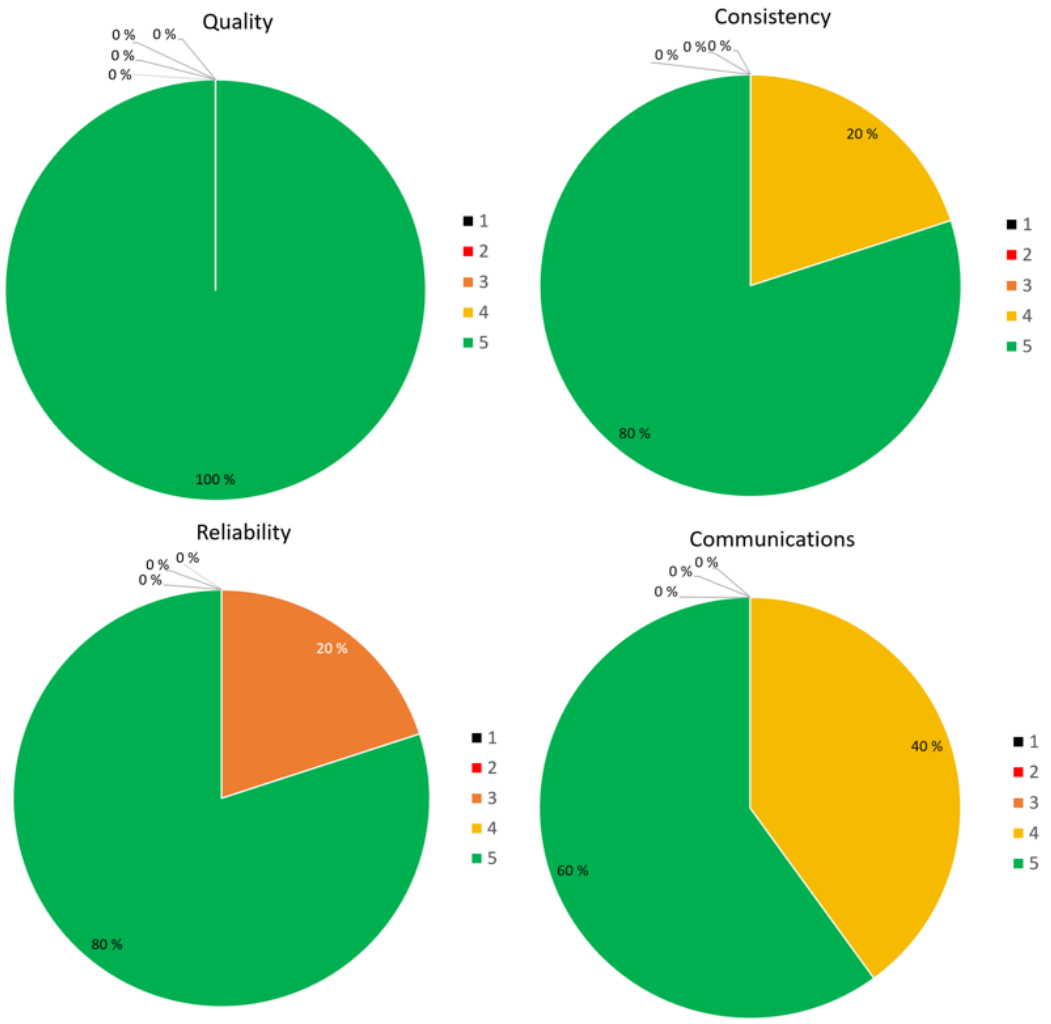


Figure 9. Quality, Consistency, Reliability & Communications.

Consistency and reliability can be tied to overall quality, which is most likely the reason, why these factors were also rated with such a high number with an average of 4,8 in consistency and 4,6 in reliability. Having a consistent and reliable supplier means that the procuring company can expect a constant supply of good quality products, without many flaws (Lang & Wilkerson, 2008). Ratings for different importance factors are illustrated in table 1.

Communications reached a relatively high importance factor with an average of 4,6 points from the polls gathered. Having an efficient flow of information between procuring and supplying company is crucial, especially in situations where time is of the essence.

Constant and sufficient flow of information is an aspect of quality too, whenever there are changes for the product specifications or other important things to consider concerning the final product and the materials needed for its production. (Agarwal & Narayana, 2020)

All the importance factors combined got an average value of 3,78, which indicates the importance of selecting a suitable supplier concerning quality and processes. With high rate of the overall importance of the factors in the analysis, supplier evaluation raises to a level of great importance and thus should be done frequently to assure the quality and certainty of production.

Factor	Importance	Additional information
Price	3,4	How competitive are the prices with the supplier.
Quality	5	Overall quality of products and operations.
Location	2	Is the company close by. Local or foreign.
Reliability	4,6	How well does the company operate in given parameters (time, quality).
Capacity	3,4	How much and how fast can the company produce products.
Resources	3,6	Adequacy and competence of personnel and equipment.
Economy	3	Financial stability of the company.
Communications	4,6	Quickness, ease and clearness of communication.
Consistency	4,8	How consistent are the operations and product quality.
Sustainability	3,4	How ecological and sustainable values are executed.

Table 1. Ratings for Importance Factors.

Table 1 shows the averages of every importance factor, that were voted in the questionnaires (see appendix 1). These means are calculated from the votes given out by Kyrö Distillery's employees. Additional information on these factors is explained in the boxes on the right. Evaluation of suppliers in the decision matrix analysis is based on these criteria (Abdollah et al, 2015).

Sustainability is also growingly important in Kyrö Distillery's values, which came up during the interviews. Having sustainable and ecological values in a company is also important for stakeholders and starting to be more crucial especially from the customer's point of view. For smaller companies, this may be challenging because of the possible increase in costs. (Barbosa, Castañeda-Ayarza & Lombardo Ferreira, 2020)

Price, resources, and capacity were placed relatively high on average, by means of importance in different supplier features. Pricing is one of the key points for gaining a competitive advantage in the market. In order to keep product prices at an enticing level, supplier's prices must also be competitive. Even though Kyrö Distillery has the advantage of having a high-end product, which can be interpreted as a more expensive product, the prices cannot be risen to a level of possible loss of interest amongst customers. (Zhou & Gupta, 2019)

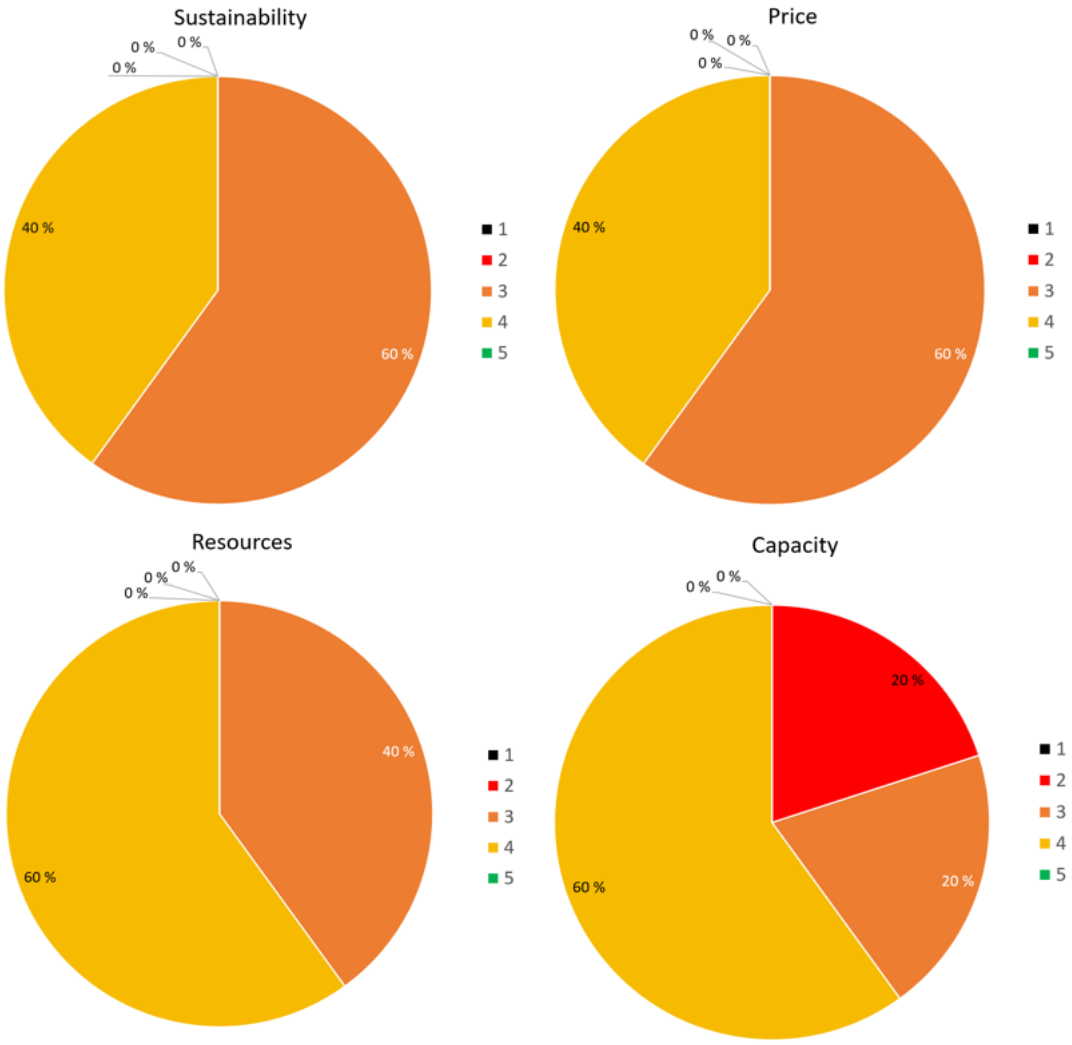


Figure 10. Sustainability, Price, Resources & Capacity.

Resources as a factor in the decision matrix (see Figure 8) have an effect on all the other factors in the analysis and thus got high numbers in the evaluation of importance. In this case, resources indicate both material and immaterial resources. Physical resources can contain machinery and facilities, while immaterial resources can relate to a level of talent amongst the staff in the supplying company. Social resources enrichen the company's network and enhances the cooperation between procuring company and supplier. (Johnston, Kung & Shields, 2020)

Economy and location were rated as 2 factors with the least value. Location may not be so crucial in matters of business, but it may have an effect on costs and environmental impact. It might be easier to work with a supplying company, that is located close because it gives a possibility for a quick face to face meetings and also factory visits, which can be really useful in understanding the supplier's processes. The economy of a supplying company is something to monitor on because if the supplier is financially unstable, it lowers their reliability for production. It might even put the continuity of order deliveries in uncertainty, which can be risky for the procuring company. (Emirhüseyinoğlu & Ekici, 2019)

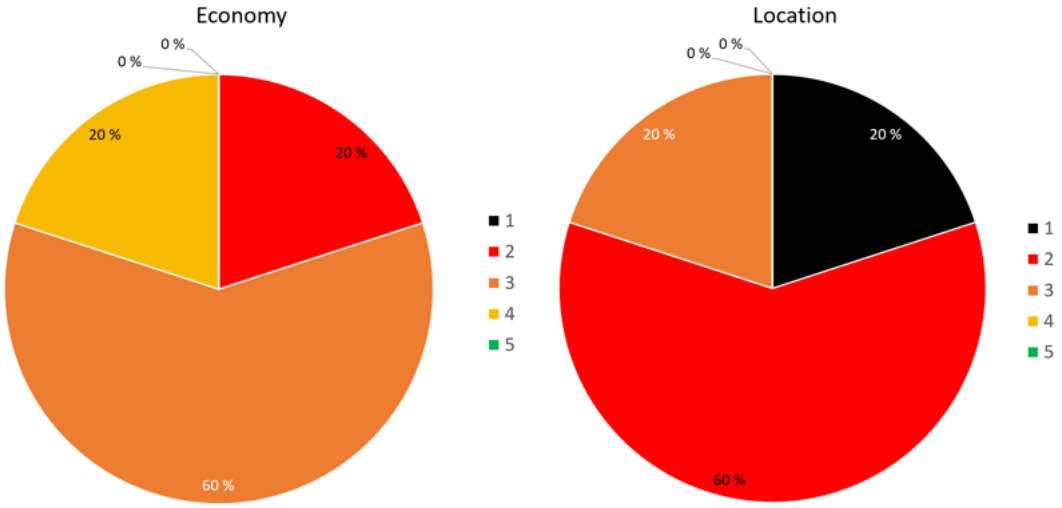


Figure 11. Economy & Location.

The outcome of the analysis is that the ratings of different factors do not vary a lot between Kyrö Distillery's employees. This tells from conjoined company values and working company culture. Employees are more or less on the same level of ideology for what it comes to valued factors in suppliers. This kind of mindset helps to create a firm supplier database and reduces conflicts inside sourcing and procurement departments. Efficient communication and good relationships between employees inside a company lead to good company culture and better efficiency. (Dermol & Širca, 2018)

Evaluating Current Suppliers: Evaluation of Kyrö Distillery's suppliers was executed on the basis of factors obtained from several surveys, that were sent out to the company's employees responsible for sourcing and procurement (see appendix 2). These ratings built the basis for decision matrix factors (Abdollah et al, 2015). Different factors in the matrix were rated as illustrated in table 1. Ratings for seven different suppliers are calculated in the matrix seen in figure 12 below. Suppliers are named from supplier 1 to 7.

Importance Rating: 1-5 | ✓ Good level | ! Needs more attention | ✗ Actions should be considered

Factors:	Cost	Quality	Location	Reliability	Capacity	Resources	Economy	Communications	Consistency	Sustainability	Total
Importance:	3,4	5	2	4,6	3,4	3,6	3	4,6	4,8	3,4	
Supplier 1	4	4	3	5	4	4	4	4	4	3	✓ 150,4
Supplier 2	3,5	4	2,5	3,5	4	3,5	4,5	3	4,5	2,5	! 136,6
Supplier 3	3	4	4	4	4	4	3	4	5	3	✓ 146,2
Supplier 4	4	5	2	5	4	3	3	4	5	3	✓ 151,6
Supplier 5	3,5	3,5	4	4	4	4	4,5	4	4	3	✓ 145,1
Supplier 6	4	5	1	4	3	3	4	4	4	3	! 139,8
Supplier 7	4	5	4	5	4	4	3	5	5	3	✓ 163,8

Figure 12. Decision Matrix Analysis of Kyrö Distillery's Suppliers.

Colors in the matrix indicate the current state of a factor between different suppliers starting from dark green and going from lighter green to orange, yellow, and ending up on red. For example, the location for supplier 6 is rated as 1, which is the least preferable rating and thus is colored red. The supplier ratings in the matrix are averages of ratings from answers to the surveys given out by Kyrö Distillery's employees. Suppliers, that were in this analysis are in order from 1-7 starting from the biggest € share of all purchases and ending to the one with the least € share.

Suppliers on a good level according to the total points, are marked with a green checkmark. Suppliers, that require more attention, or should be taken into more strict observation are marked with an exclamation point and a yellow color. Relatively poorly performing suppliers are illustrated with a red X. The values for these marks are set to be as shown in figure 13 below.

>=140 ✔	Good level
<140 !	Needs more attention
<120 ✖	Actions should be considered

Figure 13. Supplier Performance Marks.

After relevant suppliers have been rated, the next step is to compose a list of approved suppliers (ASL). As seen from figure 13, two suppliers were set under 140 points and thus should need more attention. Suppliers on a good level can be set to ASL and for lower scoring suppliers, alternative options could be considered. ASL would be then updated quarterly with a re-evaluation of current suppliers. (Plank & Kijewski, 1991)

The current state of the suppliers included in this analysis seem to be on a good level at most parts. Quality, reliability, consistency, and communications as the most valued factors seems to be on a relatively good level with all the suppliers, which shows that Kyrö Distillery's supplier evaluation process is on the right track, since the company has managed to keep their suppliers on these levels. The ever-growing importance of sustainability will probably play a bigger role in supplier evaluation on the future, since it is not yet on the optimal level (Ahmadi, Petrudi & Wang, 2017).

4.3 Future Improvements for Kyrö Distillery

Possible future improvement for Kyrö Distillery is to move towards Lean production by reducing inventory sizes and executing different Lean tools explained in the chapter 4.3.1 below. A Leaner production model would reduce the amount of money tied in storages and thus would leave Kyrö Distillery more money for investments and running expenses (Belhadi, Touriki & El Fezazi, 2018; Deming, 1986; Imai, 1986). Propositions for an added element to Kyrö Distillery's ERP-system are also explained in the future improvements section below (Thomson, 2010).

4.3.1 Lean Six Sigma Execution in Kyrö Distillery

Lean is a mindset and method where the focus is on removing all excess time and money wasted. Six Sigma focuses on keeping company operations similar, by cutting off alteration. In an ideal situation, company does not produce too many products and wastes no time with the production phases. Also, inventories should be kept low, and procuring should be built around it by optimizing order sizes and logistics. Six Sigma refers to a process with a minimal number of faults (Antony, 2011). The current model of Kyrö Distillery leans more towards broader storage and with leaner production, the storage sizes could be scaled down.

LSS methodology is broadly known and used all over the world. It is still growing and evolving, even though the basis for it was built a long time ago. LSS contains many useful tools for companies, who aim to execute the method and thrive in excellent quality processes. LSS is not a short-term solution, but a long-lasting process of finessing the company's operations and setting the mindset inside the company culture and to all the ways of operating. (Antony, 2017) LSS based production model takes time to develop, so Kyrö Distillery could start implementing it step by step and continue to improve it with a steady pace in the projected timetable.

Continuous Improvement: Continuous improvement ensures, that a company can maintain or even improve its position in the market in the long term. Kaizen as a tool for continuous improvement, was first introduced by Imai (1986) and it has been an effective tool for Lean and TQM ever since. Kaizen aims to improve companies' processes through a constant flow of innovations done by people working in the company. (Iwao, 2017)

Kaizen improvements are executed via short Kaizen events, that usually last no more than 2 weeks. In these events the team, working on the part of the production, that is under the process of improvement, works together to find the problems in the production phase. After locating the problems, data is analyzed, and the team tries to figure out

solutions to these problems. Finally, the solutions are implemented to the system, and results are presented to management. (Vo, Kongar & Suárez Barraza, 2019) Kaizen could be executed in Kyrö Distillery inside teams of different production areas. Teams would then present the ideas for improvement to management, that would analyze the possibility of executing the maneuver.

Finding the original source of the problem is the key point of Kaizen events. This can be executed by going deeper into the root of a problem by executing a 5-why analysis. Solving the root cause with this tool is broken down into 5 whys, which specify the problem's origin and eventually leads to the root of the problem. (Braglia, Frosolini & Gallo, 2017) An example of a possible problem situation in Kyrö Distillery is illustrated in a form of a 5-why analysis in figure 14 seen below.

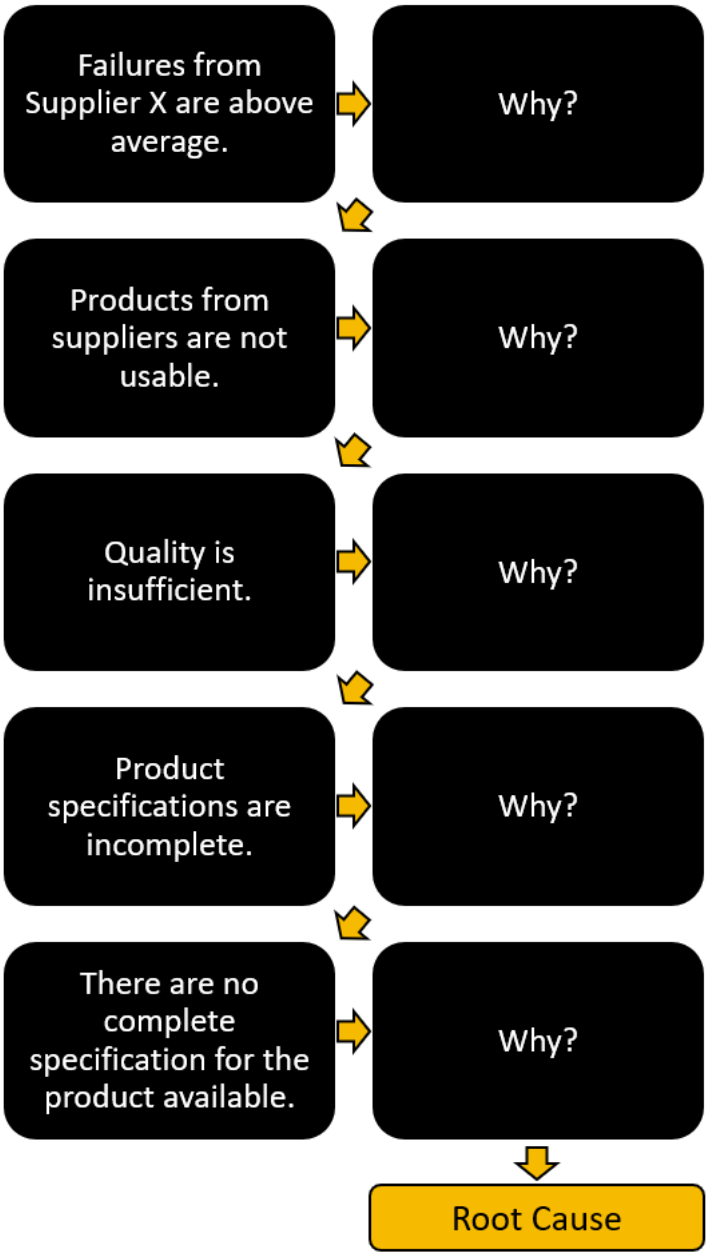


Figure 14. An example of 5-why analysis.

A possible scenario of executing 5-why starts from a rising level of failures from a supplier's side, as shown in figure 14. Turns out, that products are not usable because of poor quality. By seeking the root problems with why-questions implicates, that product specifications are incomplete, because there are no complete data for products available.

By seeking an answer to this eventually leads to finding the root cause, which is the first step of fixing this problem. (Braglia et al, 2017)

Practicing measures tied with operational excellence are developed for enhancing companies' operations related to overall quality. The effects of operational excellence can be seen in positive outcomes in companies' profits and also as satisfaction between customers. It is a practice aiming for improving overall quality in a longer period of time and it can be closely tied to continuous improvement introduced by Deming (1986). Operational excellence refers to all the activities circling around the enhancement of companies' operations. (Mangla, Kusi-Sarpong, Luthra, Bai, Jakhar & Khan, 2020)

Operational Excellence: Operational excellence covers a lot of different areas in a company's operations and it culminates in beating competitors in the same field. Measuring operational excellence starts from the product design and goes through all the phases until the satisfaction of end customers is measured. Operational excellence started out by focusing only on activities and processes being executed inside the company, like making and assembling the company's products, but later on, it has spread to cover all the company's operations. (Spacey, 2019) Executing measures of operational excellence is crucial for companies making high-end products, like Kyrö Distillery.

Operational excellence is a long-term process of tying a company's operations together in the most efficient way. The goal is to enhance quality and reduce costs, starting from strategic measures and ending up in measuring customers' feelings about the product. Innovation plays a big part in reforming operations to do better. Innovative ideas should be encouraged from blue-collar employees to management. Leadership and safety measures in a workplace also count as factors in operational excellence. Key points of operational excellence are illustrated in figure 15 seen below (Herman, 2019). Different teams of Kyrö Distillery could set a goal of possible improvement ideas inside a team in a given time period. These would then be gathered and taken to management in example quarterly.

Figure 15. Operational Excellence. (Herman, 2019)

Different areas of operational excellence are linked to each other, as shown in figure 15. It is a process of maintaining the level of excellent processes, by going through these steps chronologically, starting with the strategic decisions, that creates the big picture for the company's operations. Enhancing these operations, by getting the right mindset for employee involvement and guaranteeing customer satisfaction, is the key to harnessing this model of operating and gaining a competitive advantage on market. (Herman, 2019)

An important method of visualizing and executing a process for improving some problematic area in a company's operations is DMAIC (Define, Measure, Analyze, Improve & Control). It is one of the key points for executing successful LSS (Shankar, 2009). DMAIC works in cycle-like motion and has taken influences from Deming's (1986) cycle, which is also known as Plan-Do-Check-Act (PDCA) cycle. After the DMAIC process is implemented,

it can be done again from the beginning, if the process was unsuccessful or if the team is not satisfied with the results. DMAIC can be implemented in Kyrö Distillery's operations to create a framework for improvement processes. DMAIC helps with documenting and following internal development projects. (Smetkowska & Mrugalska, 2018)

Define phase starts with marking the problem, or phase under inspection. Mapping possible resources needed for the problem and setting a timeline for the process are also starting points for DMAIC. In the measure phase data is gathered from the part, the project is focusing on and also some test runs can be operated. Analyzing the data from the measure phase and identifying the root of the problem is done in the middle phase of DMAIC. In the improve phase, the improvement ideas are carried out and the most efficient one is chosen. In the control phase, the idea is to keep on the process of continual improving and document the outcomes. (Smetkowska & Mrugalska, 2018) Illustration of the DMAIC-process can be seen in figure 16 below.

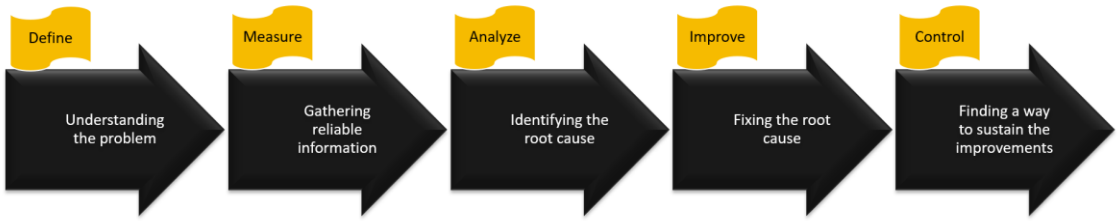


Figure 16. DMAIC Model. (Brahma, 2018)

DMAIC model as illustrated in figure 16, is a process of improvement with five phases. These phases go on starting from the define phase and ending up to the control phase. Black arrows in the figure illustrate the direction of the process and the yellow boxes indicate the name of the phase. The core of each phase is briefly explained inside the arrows. (Smetkowska & Mrugalska, 2018)

New Workflow Analysis: Refined workflow analysis concerning quality is an efficient way of keeping track of the correlation of supplier's action to product quality. If a defect is

noticed in product inspection, the next step is to analyze the rest of the batch and find out the reason for the anomaly. If it is a cause of a supplier's faulty actions, the supplier in charge of the quality defect needs to be found and contacted. Immediate actions of finding out and fixing the root cause for these quality faults should be taken and enhanced surveillance towards the supplier's processes and quality of their products should be implemented. (Thorne, 2015) A proposition for a new workflow in Kyrö Distillery's product inspection is illustrated in appendix 3.

The most difficult part in implementing a new workflow to replace an old one is the transition phase from old to new. Standardized operations, that are deep-rooted into the company culture and ways of operating, can be a difficult task to change. The most common obstacles are anti-change ideologies and lack of time (Thorne, 2015). The ideology of change and innovation should be encouraged in order to avoid becoming a standstill company, with a fading amount of interest. Stakeholders are expecting to see new and innovative ideas from a company (Ringberg, Reihlen & Rydén, 2019).

Improvements for Supplier Evaluation and Purchase Orders: First step of creating a standardized and efficient supplier evaluation process in the future is to create a timeline for the evaluation maneuvers. A proposition for this would be to execute the evaluation, for example using a decision matrix analysis, quarterly. This helps to keep Kyrö Distillery's supplier database up-to-date and eliminates the threat of diminishing level of production, or quality by discovering poor supplier functioning in the early stages. (Gadde & Snehota, 2019)

After the timeline for supplier evaluation is set, the evaluation process needs to be standardized and set to function properly. Quarterly evaluations with decision matrix help to give a constant picture of supplier functioning. It is important for Kyrö Distillery to keep the supplier ratings updated. Persons responsible for evaluating suppliers and keeping the list updated should be set, so the supplier list does not get unattended. (Abdollah et al, 2015)

An addition to Kyrö Distillery's current process of tracking orders would be to start measuring delivery accuracy. This is closely tied to supplier performance and also affects the supplier evaluation. Kyrö Distillery's ERP currently shows the date, when a purchase order is made, but it does not state the delivery date when the order is set to arrive by contract, nor the actual delivery date it arrives. With these additions' delivery accuracy could be measured by comparing the delivery date in the ERP to the actual delivery date. The difference in the dates would be then calculated and all the suppliers would get their OTD rating. Failure to deliver the goods on time would then affect supplier efficiency negatively (Kamali, 2018; Thomson, 2010).

Kyrö Distillery's purchase orders do not automatically go to a supplier once the order is made in the ERP system. This causes unnecessary work for the procuring department and thus an automated order should be sent straight to a supplier from the ERP system. This could be executed with deeper, long-time suppliers, whose system can cooperate with Kyrö Distillery's current ERP system. An easier, but also efficient method would be to set the ERP system to automatically send the order to a supplier by e-mail. The system could also automatically track the order quantities by usage and detect shortage in the materials, from which it could automatically create a proposition for a purchase order to the ERP system. These would then be checked and ordered if needed by purchasers. (Lambert, Calvasina, Bee & Woodworth, 2017; Thomson, 2010)

Kyrö Distillery's procuring employees could check the open orders still waiting to be delivered from supplier 2-3 times a week and compare the expected delivery date to the actual delivery date of the product. If the products are late, should the employees calculate the value of the late orders from a supplier, to get an accurate view of how much money is tied into late orders. The orders may also be delivered in a few different partial deliveries and in this scenario, the amount of goods from the total value of the delivery is calculated. This gives Kyrö Distillery concrete information, which parts of the delivery are still to arrive and what is the monetary value tied to the goods, that did not yet arrive.

By updating order status constantly, inventory values are more accurate, and the volume of orders stays in hand since there are not any excess orders and values in the ERP system (Thomson, 2010). It is important to keep these actions transparent to suppliers and thus inform them of the values of late orders and make inquiries about the state of these orders. This helps to get a broader view of the supplier's current state and it is also the first step for correcting these problems. Transparency and frequent contacts with suppliers lead to closer cooperation and a more efficient business model. (Morgan, Richey Jr & Ellinger, 2018)

When supplier efficiency is on a relatively high level, the orders are delivered faster. Supplier evaluation can lead to improved delivery times through tendering and eventually improving the cooperation with suppliers on a more efficient level. With faster delivery times, Kyrö Distillery's inventories could be reduced in size, which would leave a lot more excess money to the company's use since it is not tied to huge volumes of materials in warehouses (Ivanov, 2020). Calculating the right number of items to order at a time is the first step of improving the warehousing after getting the supplier efficiency and reliability on a good level. This can be calculated with Economical Order Quantity (EOQ) as illustrated below. (Fernando, 2021)

$$Q = \sqrt{\frac{2DS}{H}} \tag{4}$$

where

Q = EOQ units

D = Demand in units

S = Order cost

H = Holding costs

EOQ is a great addition to Kyrö Distillery's warehousing management, which can be successfully implemented after thorough supplier evaluation. EOQ can be calculated by

demand and order cost with 2 and dividing them with the costs of holding the units in storage. These can be scaled to match one year's consumption. Calculating the holding costs can be difficult since Kyrö Distillery has a little bit of storage room everywhere and rethinking the use of all the excess space taken by large inventories should be thought off to get a value for the storage space. (Fernando, 2021) Having optimal order sizes is especially important for Kyrö Distillery as a rapidly growing company, that is still adjusting its form in the alcoholic beverage market. Raw materials needed for these beverages spoil relatively fast in the storage if ordered in too large amounts. Sudden brand reforms can also cause disposing of older materials, that are not anymore needed in the new structure of the products.

Meetings with suppliers are important to strengthen the relationship between Kyrö Distillery and its suppliers. Organizing quarterly supplier meetings and on-site visits for Kyrö Distillery's employees to suppliers' sites and vice versa helps to enhance the cooperation and creates a more profound image of the situation and operation methods between the two companies. In Kyrö Distillery's case the purchasers could do these meetings with their designated suppliers and to narrow it down, even more, the meetings could be done with only the most important suppliers, or only with the suppliers with a lot of transactional value. The personnel working in procurement could arrange these meetings independently and summaries of these meetings would then be discussed between the procuring department in a scheduled meeting. (Glavee-Geo, 2019)

4.4 Validity and Reliability of the Study

Enforcing transparency is the key point for reliability and validity in research. The same ideology can be adapted to supplier evaluation. The transparency of actions and processes between a supplier and a supplying company eventually leads to a better understanding of both parties' processes and creates benefits for both parties. Methodology concentrated on enhancing Kyrö Distillery's processes towards suppliers in order to create thriving relationships and efficient supplying array. Goal-consistent cooperation

creates lasting and effective relationships between suppliers and procuring company. (Kim, Park, S. H., Ryoo & Park, S. K., 2010; Mohajan, 2017)

This research was constructed with mixed methods but leaning towards a qualitative measure. Thorough literature review and surveys based on experience and opinions built the basis for data-analysis and formed the empirical study. Using mixed methodology can increase the reliability and validity of a study and thus the data in this thesis is on a strong basis, even though the sampling rate would preferably be more comprehensive. The theoretical overview consolidates the data analysis and leads the way to the conclusion of the data. (Zohrabi, 2013)

On the basis of this research, possible process improvements can be implemented into Kyrö Distillery's processes. Some of the renewal ideas are subject to develop further and take a specific shape fit to the company's current needs and situation. Moreover, this thesis mainly concentrated on the analysis of the current situation and possible maneuvers to be made for enhancing the ongoing situation. These could be clearly discovered by multiple interviews and surveys and the extensive literature review supported the analysis.

Having more extensive studies of the analysis results with the supplier would create more transparency and further elaborate the actual outcome of the analysis and give out more inner perspective of the validity and reliability of this research. However, this kind of extension to the current analysis would take relatively long time period, but definitely is a subject for future research.

5 Summary and Conclusions

This final chapter of the thesis summarizes the objectives, that were set for this research. It also goes through the findings from the literature and the empirical part, which concentrated to find the solutions to the research objectives. Finally, it ties the research together and possible opportunities for future research are proposed.

5.1 Summary of the Research

The research started by defining the problems and goals of this thesis, which continued limiting the area of research and further familiarizing with Kyrö Distillery, which played a role of the case company in this research. Supplier evaluation was thoroughly investigated through multiple literatures found of the subject. After the background of this thesis was discussed, the theoretics behind the methodological study were explained, and by leaning on the theories, the empirical study including the actual evaluation of Kyrö Distillery's suppliers were conducted.

In the making of this research, it turned out, that supplier evaluation is complex to do with only monetary values from supplier trades and data gathered from the ERP-system (Thomson, 2010). Supplier evaluation can still be implemented relatively accurately by relying on the information of employees in charge of sourcing and procurement. Although, this kind of analysis gives a relatively profound look into supplier's current state, the accuracy of the method is slightly reduced by the fact, that it mostly relies on opinions, given by the employees working for Kyrö Distillery. With larger sampling, the numbers can be enhanced to illustrate the actual state of suppliers' performance more accurately.

The question of what supplier evaluation can improve is relatively complex since supplier activities affect a huge part of a manufacturing company's processes. It can improve total quality and delivery times, but it can save a lot of money and time as well. Suppliers performing excellently creates the basis for high-end quality production like Kyrö

Distillery, and thus it makes the supplier performance and its evaluation crucial. Supplier evaluation can be executed in a brief amount of time, but it should be given enough time to make it broad and accurate. Repeated evaluations on a predetermined time schedule are the key to creating a lasting routine for supplier evaluation.

Objectives for this study were:

1. Identifying the execution of supplier evaluation.
2. Identifying how supplier evaluation enhances delivery times.
3. Establishing, how supplier evaluation leads to improving quality.

Supplier evaluation was executed by gathering importance for the rating factors and ratings for few suppliers by multiple polls filled by Kyrö Distillery's employees. Suppliers were then evaluated using decision matrix analysis (Abdollah et al, 2015). This method defined the current state of the company's suppliers, which were rated in the empirical part of the study. Process for supplier evaluation was implemented with these phases, excluding phase number five, which is a proposition for future evaluation:

1. Choosing the suppliers for evaluation.
2. Setting the importance factors for the analysis.
3. Rating supplier performance on the given factors.
4. Moving suppliers to ASL or conducting further inspection of the performance depending on the total score in the decision matrix analysis. (Abdollah et al, 2015; Plank & Kijewski, 1991)
5. Quarterly repetition of the evaluation.

Based on the research, supplier evaluation can improve both quality and delivery time, by reforming the supplier base. Evaluation can point out weaker suppliers, but it can also expose supplier's weakest performing parts. Improving these parts with suppliers or tendering new suppliers to replace the weak performing one's lead to improving processes in supplier's areas of operating, which are closely tied to both quality and delivery times.

Executing Lean production and setting the mindset for continuous improvement in Kyrö Distillery's operations concentrated for improving overall quality and delivery times, which includes supplier evaluation can lead to significant improvements in supplier co-operation (Antony, 2017).

5.2 Future Research and Conclusions

Supplier evaluation is a crucial step for building a comprehensive and expeditious enterprise. Successful supplier evaluation increases prices, product quality, and delivery times, as stated earlier in this research. A strong and reliable supplier base supports a lot of other operations in a procuring company. Operative measures are easier to execute and a lot of time is saved when the reliability of suppliers is on a good level, since the amount of work needed to be done with complaints or tracking orders is reduced. (Hald & Ellegaard, 2011)

A lot of interesting subjects for future research definitely lie in supplier development. In Kyrö Distillery's case the next step could be to closer measure the perks of both the direct and indirect approach of supplier development and see which one suits them best. This could be pondered between suppliers in a way that, suppliers with closest relationships and good performing processes, could be ones to be developed directly. Different supplier development strategies are further explained in chapter 3.2. (Yawar & Seuring, 2018)

In ever-growing need for more sustainable solutions in corporate SCM matters, Kyrö Distillery, like other companies need to focus their operations, including the choosing of suppliers, to further carry out greener values. Thus, all kinds of sustainable solutions have a lot of future potential. Along with economical processes, ethical points in sustainable supplier evaluation are values, that should be considered when building a sustainable supplier base. Since sustainability is already one of Kyrö Distillery's core values, the

company has built a strong foundation for continuous improvement in this specific area. (Bai, Kusi-Sarpong, Badri Ahmadi & Sarkis, 2019)

To conclude this research, there lies a fairly good number of opportunities for Kyrö Distillery to better execute their supplier relations and evaluation. Among the exact maneuver of supplier evaluation and operations closely tied to it, points of improvement were found in ERP, order tracking, and various tools tied to Lean. A relatively simple and efficient way of improving the current situation in supplier evaluation would be to create ASL and to continue evaluating suppliers in a specific timeline, for example quarterly. Possible improvement opportunities have been gathered in table 2 seen below. (Deming, 1986; Thomson, 2010; Plank & Kijewski, 1991)

ASL	Quarterly Supplier Evaluation	ERP Improvements	Improved Order Tracking	Lean Six Sigma
• Updated database of suppliers	• Decision matrix analysis • Supplier meetings	• Added sections	• Deliver accuracy • OTD	• Further execution of various Lean tools

Table 2. Improvement Opportunities.

Keeping a regularly updated ASL of suppliers is one of the key points for improvement. Supplier evaluation is the main tool for building ASL. Besides the decision matrix analysis, regular meetings with suppliers, possibly on their worksites, would help to construct a profound view of suppliers' state and their level of competency (Abdollah et al, 2015). Since supplier's state can move rapidly, it is important to keep the ASL always updated with regular evaluations. (Plank & Kijewski, 1991)

ERP Improvements, as shown next in table 2, would help Kyrö Distillery in tracking their inbound logistics and thus also their supplier's performance. Added sections would be delivery date and actual delivery date. Supplier's delivery accuracy could be calculated from these dates and the monetary value of late orders and money tied in them, would

be then seen from the ERP, for example from an excel, where these values would be calculated. This improvement would give a lot of useful insights into supplier development in Kyrö Distillery, as it would clearly bring out more information about suppliers' performance. (Thomson, 2010; Hald & Ellegaard, 2011)

The last point on the improvement propositions is the further execution of different Lean tools. The tools are a great assist, especially in problematic situations and in moments of error and defects. Kyrö Distillery executes Lean type of maneuvers already in some parts, but a lot of potential for further development in that area still exists. Frequent Lean meetings could raise the company's potential a lot in the means of executing their processes more efficiently. Lean production is very multi-dimensional and thus Kyrö Distillery needs to find the tools and aspects, that fit their needs the most. (Deming, 1986; Imai, 1986)

In Kyrö Distillery's case, the implementation of these improvements could be started with having a meeting with the management team and discussing the possible opportunities in these areas. The actual implementation of the changes would be kicked off by finding competent employees for implementing these changes. After constructing the premises to the changes, a briefing session to employees affected by new changes should be kept. The transition phase would then be continued step by step until the changes are fully implemented and employees are adjusted to the changes. In case of defects, caused by the new additions, problem-solving tools are used. (Doherty & Horne, 2002)

Improvements discussed in this chapter will eventually improve the reliability of Kyrö Distillery's suppliers. This leads to improved inbound logistics and also raises the competency of Kyrö Distillery's production and outbound logistics. Better quality, by supplier development, leads to fewer flaws and also improves production rate. Excelling supplier base leads also to improved delivery times by better communication and transparency in mutual processes between Kyrö Distillery and its suppliers. Implementing these

changes should have a relatively comprehensive positive effect on Kyrö Distillery's operations concerning supplier relationships. (Mokhtar, Genovese, Brint & Kumar, 2019)

Resources needed for these changes vary from the timeline, that Kyrö Distillery wants them to be implemented in. The basic structure for ASL does not take a lot of time to build, depending on the outlook and information gathered there. Quarterly supplier evaluation could be merged into operative buyer's work, according to the suppliers or product groups they are in charge of. ERP improvements along with enhanced order tracking can be implemented by someone with expertise in the area, and it could be continuously improved as time passes. Most resources will most likely be spent in the development and execution of enhanced Lean Six Sigma since it can be continuously developed, and it needs to get integrated into the organizational culture. (Plank & Kijewski, 1991; Deming, 1986)

The results and improvement ideas discussed in this research will hopefully increase the transparency and enhance the supplier evaluation process in Kyrö Distillery. The company's supplier development should be able to improve on the basis of these research results by executing these changes in a way, that the company's management deems best.

References

Abdollah, M. F. B., Mustafa, A., Shuhimi, F. F., Ismail, N., Amiruddin, H., & Umehara, N. (2015). Selection and verification of kenaf fibres as an alternative friction material using Weighted Decision Matrix method. Materials & Design, 67, pp. 577-582. Retrieved from https://doi.org/10.1016/j.matdes.2014.10.091

Agarwal, U., & Narayana, S. A. (2020). Impact of relational communication on buyer–supplier relationship satisfaction: role of trust and commitment. Benchmarking: An International Journal. Retrieved from https://doi.org/10.1108/BIJ-05-2019-0220

Aghazadeh, S. (2003). MRP contributes to a company's profitability. Assembly Automation, 23(3), pp. 257-265. Retrieved from https://doi.org/10.1108/01445150310486521

Ahmadi, H. B., Petrudi, S. H. H., & Wang, X. (2017). Integrating sustainability into supplier selection with analytical hierarchy process and improved grey relational analysis: a case of telecom industry. The International Journal of Advanced Manufacturing Technology, 90(9-12), pp. 2413-2427. Retrieved from https://doi.org/10.1007/s00170-016-9518-z

Antony, J. (2011). Six Sigma vs lean. International Journal of Productivity and Performance Management, 60(2), pp. 185-190. Retrieved from https://doi.org/10.1108/17410401111101494

Antony, J., Snee, R., & Hoerl, R. (2017). Lean Six Sigma: yesterday, today and tomorrow. International Journal of Quality & Reliability Management, 34(7), pp. 1073-1093. Retrieved from https:// doi.org/10.1108/IJQRM-03-2016-0035

Aquilani, B., Silvestri, C., Ruggieri, A. & Gatti, C. (2017). A systematic literature review on total quality management critical success factors and the identification of new avenues of research. The TQM Journal, 29(1), pp. 184-213. Retrieved from https://doi.org/10.1108/TQM-01-2016-0003

Bai, C., Kusi-Sarpong, S., Badri Ahmadi, H., & Sarkis, J. (2019). Social sustainable supplier evaluation and selection: a group decision-support approach. International Journal of Production Research, 57(22), pp. 7046-7067. Retrieved from https://doi-org.proxy.uwasa.fi/10.1080/00207543.2019.1574042

Bakti, C. S., & Kartika, H. (2020). Analysis of Ice Cream Product Quality Control With Six Sigma Method. Journal of Industrial Engineering & Management Research, 1(1), pp. 63-69. Retrieved from https://doi.org/10.7777/jiemar.v1i1.29

Barafort, B., Mesquida, A. L., & Mas, A. (2017). Integrating risk management in IT settings from ISO standards and management systems perspectives. Computer Standards & Interfaces, 54(3), pp. 176-185. Retrieved from https://doi.org/10.1016/j.csi.2016.11.010

Barbosa, M., Castañeda -Ayarza, J. A. & Lombardo Ferreira, D. H. (2020). Sustainable Strategic Management (GES): Sustainability in small business. Journal of cleaner production, 258. Retrieved from https://doi.org/10.1016/j.jclepro.2020.120880

Belhadi, A., Touriki, F. E., & El Fezazi, S. (2018). Benefits of adopting lean production on green performance of SMEs: a case study. Production Planning & Control, 29(11), pp. 873-894. Retrieved from https://doi.org/10.1080/09537287.2018.1490971

Braglia, M., Frosolini, M. & Gallo, M. (2017). SMED enhanced with 5-Whys Analysis to improve set-upreduction programs: The SWAN approach.(Report). The

International Journal of Advanced Manufacturing Technology, 90(5-8), p. 1845. Retrieved from https://doi.org/10.1007/s00170-016-9477-4

Brahma, S. (2018). The DMAIC for business process improvement. Amile Institute. Retrieved from https://www.amileinstitute.org/blog/the-dmaic-for-business-process-improvement/

Campbell, H. F. & Brown, R. P. (2003). Benefit-cost analysis: financial and economic appraisal using spreadsheets. Cambridge University Press.

Carter, R. (1995). The seven cs of effective supplier evaluation. Purchasing & Supply Management, 44. Retrieved from https://search-proquest-com.proxy.uwasa.fi/docview/224998532?accountid=14797

Cellini, S. R. & Kee, J.E. (2015). Cost-Effectiveness and Cost–Benefit Analysis. In K.E., Newcomer, H.P., Hatry, & J.S., Wholey. Handbook of practical program evaluation. 4, pp. 493-530. New Jersey, USA: John Wiley & Sons.

Chen, J. (2020). Business-to-Business (B2B). Investopedia. Retrieved from https://www.investopedia.com/terms/b/btob.asp

Croxton, K. L., Garcia-Dastugue, S., Lambert, D. M., & Rogers, D. S. (2001). The supply chain management processes. International Journal of Logistics Management, 12(2), pp. 13-36. Retrieved from http://dx.doi.org.proxy.uwasa.fi/10.1108/09574090110806271

Dahlgaard, J., Kristensen, K. & Kanji, G. (2008). Fundamentals of Total Quality Management: Process Analysis and Improvement. Retrieved from https://doi.org/10.4324/9780203930021

Deming, W. E. (1986). Out of the crisis: Quality, productivity and competitive position. Cambridge: Cambridge University Press.

Dermol, V., & Širca, N. T. (2018). Communication, company mission, organizational values, and company performance. Procedia-Social and Behavioral Sciences, 238, pp. 542-551. Retrieved from https://doi.org/10.1016/j.sbspro.2018.04.034

Doherty, T. L., & Horne, T. (2002). Managing public services--implementing changes: a thoughtful approach to the practice of management. Psychology Press.

EFQM. (2020). EFQM Model. Retrieved from https://www.efqm.org/index.php/efqm-model/

Eldridge, S. (2013). On-time delivery. Broadcast Engineering, 55(4), pp. 23-24,26-27. Retrieved from https://search-proquest-com.proxy.uwasa.fi/docview/1346358175?accountid=14797

Emirhüseyinoğlu, G., & Ekici, A. (2019). Dynamic facility location with supplier selection under quantity discount. Computers & Industrial Engineering, 134, pp. 64-74. Retrieved from https://doi.org/10.1016/j.cie.2019.05.023

Escrig-Tena, A. B., Garcia-Juan, B., & Segarra-Ciprés, M. (2019). Drivers and internalisation of the EFQM excellence model. International Journal of Quality & Reliability Management, 36(3), pp. 398-419. Retrieved from https://doi.org/10.1108/IJQRM-08-2017-0161

Fernando, J. (2021). Economic Order Quantity – EOQ Definition. Investopedia. Retrieved from https://www.investopedia.com/terms/e/economicorderquantity.asp

Fuller, N. (2005). How many 'C's in partner? Supply Management, 10(18), pp. 35. Retrieved from https://search-proquest-com.proxy.uwasa.fi/docview/222246175?accountid=14797

Finder. (2020). Rye Rye Oy. Retrieved from https://www.finder.fi/Alkoholijuomat+viinit+ja+oluet/Rye+Rye+Oy/Isokyr%C3%B6/yhteystiedot/2739072

Gadde, L. E., & Snehota, I. (2019). What does it take to make the most of supplier relationships?. Industrial Marketing Management, 83, pp. 185-193. Retrieved from https://doi.org/10.1016/j.indmarman.2019.07.003

Glavee-Geo, R. (2019). Does supplier development lead to supplier satisfaction and relationship continuation?. Journal of Purchasing and Supply Management, 25(3), 100537. Retrieved from https://doi.org/10.1016/j.pursup.2019.05.002

Gordon, S. (2005). Seven steps to measure supplier performance. Quality Progress, 38 (8), pp. 20-25. Retrieved from https://search-proquest-com.proxy.uwasa.fi/docview/214796745?accountid=14797

Gurtoo, A. & Antony, S. (2007). Environmental regulations. Management of Environmental Quality: An International Journal, 18(6), pp. 626-642. Retrieved from https://doi-org.proxy.uwasa.fi/10.1108/14777830710826676

Hald, K. S., & Ellegaard, C. (2011). Supplier evaluation processes: the shaping and reshaping of supplier performance. International Journal of Operations & Production Management, 31(8), pp. 888-910. Retrieved from https://doi.org/10.1108/01443571111153085

Harland, C. M. (1996). Supply chain management: relationships, chains and networks. British Journal of management, 7(1), pp. 63-80. Retrieved from https://doi.org/10.1111/j.1467-8551.1996.tb00148.x

Harris, C., & Harris, R. (2015). Three pillars for building a lean supply base. Industrial Management, 57(2), pp. 26-30,5. Retrieved from https://www-proquest-com.proxy.uwasa.fi/docview/1669926285?accountid=14797

Heras-Saizarbitoria, I., Boiral, O. & Allur, E. (2018). ISO 9001, ISO 14001, and new management standards. Springer International Publishing, Retrieved from https://doi.org/10.1007/978-3-319-65675-5

Herman, S. (2019). Operational Excellence vs. Continuous Improvement. Acuity Institute. Retrieved from https://acuityinstitute.com/operational-excellence-vs-continuous-improvement/

Heshmati, A., & Lee, M. (2009). Information and communications technology. Princeton: Princeton University Press. Retrieved from https://search-proquest-com.proxy.uwasa.fi/docview/189251427?accountid=14797

Hill, R. & Solt, G. (2010). Competitive Tendering. In Engineering money: Financial fundamentals for engineers. New Jersey, USA: John Wiley & Sons, pp. 89-95. Retrieved from https://ebookcentral-proquest-com.proxy.uwasa.

International Organization for Standardization. (2020a). Homepage. Retrieved from https://www.iso.org/home.html

International Organization for Standardization. (2020b). Popular Standards. Retrieved from https://www.iso.org/popular-standards.html

Ivanov, D. (2020). Coordination of production and ordering policies under capacity disruption and product write-off risk: An analytical study with real-data based simulations of a fast moving consumer goods company. Annals of Operations Research, 291(1-2), pp. 387-407. Retrieved from https://doi.org/10.1007/s10479-017-2643-8

Iwao, S. (2017). Revisiting the existing notion of continuous improvement (Kaizen): literature review and field research of Toyota from a perspective of innovation. Evolutionary and Institutional Economics Review, 14(1), pp. 29-59. Retrieved from https://doi.org/10.1007/s40844-017-0067-4

Johnston, D. W., Kung, C., & Shields, M. (2020). Who is Resilient in a Time of Crisis? The Importance of Financial and Non-Financial Resources. IZA Discussion Paper No. 13720. Retrieved from https://ssrn.com/abstract=3695421

Kamali, A. (2018). The Way to Optimize On-Time Delivery (OTD) in Logistics-Firms in Bahrain. CiiT International Journal of Artificial Intelligent Systems and Machine Learning, 10(9), pp. 198-204. Retrieved from https://www.researchgate.net/publication/329253375_The_way_to_optimize_On-Time_Delivery_OTD_in_Logistics-Firms_in_Bahrain

Karuppusami, G., & Gandhinathan, R. (2007). Web-based measurement of the level of implementation of TQM in Indian Industries. Total Quality Management and Business Excellence, 18(4), pp. 379-391. Retrieved from https://doi.org/10.1080/14783360701231351

Kim, K. K., Park, S. H., Ryoo, S. Y., & Park, S. K. (2010). Inter-organizational cooperation in buyer–supplier relationships: Both perspectives. Journal of Business Research, 63(8), pp. 863-869. Retrieved from https://doi.org/10.1016/j.jbusres.2009.04.028

Kram, M., Tosanovic, N., & Hegedic, M. (2015). KAIZEN APPROACH TO SUPPLY CHAIN MANAGEMENT: FIRST STEP FOR TRANSFORMING SUPPLY CHAIN INTO LEAN SUPPLY CHAIN. Annals of the Faculty of Engineering Hunedoara, 13(1), pp. 161-164. Retrieved from https://www-proquest-com.proxy.uwasa.fi/docview/1655118089?accountid=14797

Kyrö Distillery Company. (2020a). The Story of the Kyrö Distillery. Retrieved from https://kyrodistillery.com/distillery/story/

Kyrö Distillery Company. (2020b). Kyrö Shop. Retrieved from https://kyrodistillery.com/region_FI/shop/

Lambert, D. M., & Schwieterman, M. A. (2012). Supplier relationship management as a macro business process. Supply Chain Management: An International Journal, 17(3), pp. 337-352. Retrieved from https://doi-org.proxy.uwasa.fi/10.1108/13598541211227153

Lambert, S. L., Calvasina, R., Bee, S., & Woodworth, D. (2017). Assembly FG: An educational case on MRP II integrated within ERP. Accounting perspectives, 16(1), pp. 43-62. Retrieved from https://doi.org/10.1111/1911-3838.12136

Lang, W. S. & Wilkerson, J. R. (2008). Accuracy vs. Validity, Consistency vs. Reliability, and Fairness vs. Absence of Bias: A Call for Quality. Paper Presented at the Annual Meeting of the American Association of Colleges of Teacher Education (AACTE). Retrieved from https://files.eric.ed.gov/fulltext/ED502868.pdf

Mangla, S. K., Kusi-Sarpong, S., Luthra, S., Bai, C., Jakhar, S. K., & Khan, S. A. (2020). Operational excellence for improving sustainable supply chain performance.

Resources, Conservation, and Recycling, 162, 105025. Retrieved from https://doi.org/10.1016/j.resconrec.2020.105025

MindTools. (2017). Carter's 10 Cs of Supplier Evaluation: Evaluating Potential Suppliers. Retrieved from https://www.mindtools.com/pages/article/10-cs.htm

Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. Annals of Spiru Haret University. Economic Series, 17(4), pp. 59-82. Retrieved from https://doi.org/10.26458/1746

Mokhtar, A. R. M., Genovese, A., Brint, A., & Kumar, N. (2019). Improving reverse supply chain performance: The role of supply chain leadership and governance mechanisms. Journal of cleaner production, 216, pp. 42-55. Retrieved from https://doi.org/10.1016/j.jclepro.2019.01.045

Morgan, T. R., Richey Jr, R. G. & Ellinger, A. E. (2018). Supplier transparency: Scale development and validation. The International Journal of Logistics Management, 29(3), pp. 959-984. Retrieved from https://doi.org/10.1108/IJLM-01-2017-0018

National Institution of Standards and Technology. (2019). How Baldrige Works. Retrieved from https://www.nist.gov/baldrige/how-baldrige-works

Padhi, N. (2010). The Eight Elements of TQM. ISixSigma. Retrieved from https://www.isixsigma.com/methodology/total-quality-management-tqm/eight-elements-tqm/

Plank, R. E., & Kijewski, V. (1991). The use of approved supplier lists. International Journal of Purchasing and Materials Management, 27(2), pp. 37-41. Retrieved from https://doi.org/10.1111/j.1745-493X.1991.tb00532.x

Podsakoff, P. M., & Podsakoff, N. P. (2019). Experimental designs in management and leadership research: Strengths, limitations, and recommendations for improving publishability. The Leadership Quarterly, 30(1), pp. 11-33. Retrieved from https://doi.org/10.1016/j.leaqua.2018.11.002

Porter, M. E. (1985). Technology and competitive advantage. Journal of Business Strategy (Pre-1986), 5(3), pp. 60. Retrieved from https://www-proquest-com.proxy.uwasa.fi/docview/209880770?accountid=14797

Ringberg, T., Reihlen, M., & Rydén, P. (2019). The technology-mindset interactions: Leading to incremental, radical or revolutionary innovations. Industrial Marketing Management, 79, pp. 102-113. Retrieved from https://doi.org/10.1016/j.indmarman.2018.06.009

Safa, M., Shahi, A., Haas, C. T., & Hipel, K. W. (2014). Supplier selection process in an integrated construction materials management model. Automation in Construction, 48, pp. 64-73. Retrieved from https://doi.org/10.1016/j.autcon.2014.08.008

Santos, G., Murmura, F. & Bravi, L. (2019). Developing a model of vendor rating to manage quality in the supply chain. International Journal of Quality and Service Sciences, 11(1), pp. 34-52. Retrieved from https://doi.org/10.1108/IJQSS-06-2017-0058

Saunders, M., Lewis, P. & Thornhill, A. (2016). Research methods for business students (7th ed.). Harlow: Pearson Education.

Seth, D., Nemani, V. K., Pokharel, S. & Al Sayed, A. Y. (2018). Impact of competitive conditions on supplier evaluation: A construction supply chain case study. Production

planning & control, 29(3), pp. 217-235. Retrieved from https://doi.org/10.1080/09537287.2017.1407971

Shankar, R. (2009). Process Improvement Using Six Sigma: A DMAIC Guide. Quality Press.

Smętkowska, M., & Mrugalska, B. (2018). Using Six Sigma DMAIC to improve the quality of the production process: a case study. Procedia-Social and Behavioral Sciences, 238, pp. 590-596. Retrieved from https://doi.org/10.1016/j.sbspro.2018.04.039

Spacey, J. (2017). 7 Types of Quality. Simplicable. Retrieved from https://simplicable.com/new/quality-types

Spacey, J. (2019). 9 Examples of Operational Excellence. Simplicable. Retrieved from https://simplicable.com/en/operational-excellence

Sundtoft Hald, K. & Ellegaard, C. (2011). Supplier evaluation processes: The shaping and reshaping of supplier performance. International Journal of Operations & Production Management, 31(8), pp. 888-910. Retrieved from https://doi:10.1108/01443571111153085

Tan, K. C. (2001). A framework of supply chain management literature. European Journal of Purchasing & Supply Management, 7(1), pp. 39–48. Retrieved from https://doi.org/10.1016/s0969-7012(00)00020-4

Tarver, E. (2020). Value Chain vs. Supply Chain: What's the Difference? Investopedia. Retrieved from https://www.investopedia.com/ask/answers/043015/what-difference-between-value-chain-and-supply-chain.asp

Thomson, J. D. (2010). Enterprise Resource Planning. E-Entrepreneurship and ICT Ventures, pp. 235–250. Retrieved from https://doi.org/10.4018/978-1-61520-597-4.ch013

Thorne, J. J. (2015). Keys to Improve Maintenance Workflow. Reliableplant, Noria Corporation. Retrieved from https://www.reliableplant.com/Read/30008/improve-maintenance-workflow

Tirkel, I. & Rabinowitz, G. (2014). Modeling cost benefit analysis of inspection in a production line. International Journal of Production Economics, 147, pp. 38. Retrieved from https://doi.org/10.1016/j.ijpe.2013.05.012

Vo, B., Kongar, E. & Suárez Barraza, M. F. (2019). Kaizen event approach: A case study in the packaging industry. International Journal of Productivity and Performance Management, 68(7), pp. 1343-1372. Retrieved from https://doi.org/10.1108/IJPPM-07-2018-0282

Yawar, S. A., & Seuring, S. (2018). The role of supplier development in managing social and societal issues in supply chains. Journal of cleaner production, 182, pp. 227-237. Retrieved from https://doi.org/10.1016/j.jclepro.2018.01.234

Yonglin, Y., Qiusheng, Z. & Tao, Z. (2010). The Innovation of Value Chain Management in Network Economy. 3rd International Conference on Information Management, Innovation Management and Industrial Engineering, Kunming, pp. 341-343, Retrieved from https://doi.org/10.1109/ICIII.2010.88.

Yeo, R. K. (2019). From operational excellence to organizational significance: Setting the tempo for change. Strategic HR Review, 18(4), pp. 142-149. Retrieved from http://dx.doi.org.proxy.uwasa.fi/10.1108/SHR-04-2019-0027

Zhou, L., & Gupta, S. M. (2019). Marketing research and life cycle pricing strategies for new and remanufactured products. Journal of Remanufacturing, 9(1), pp. 29-50. Retrieved from https://doi-org.proxy.uwasa.fi/10.1007/s13243-018-0054-x

Zohrabi, M. (2013). Mixed Method Research: Instruments, Validity, Reliability and Reporting Findings. Theory & practice in language studies, 3(2), pp. 254-262. Retrieved from https://doi.org/10.4304/tpls.3.2.254-262

Appendices

Appendix 1. Evaluation of Supplier Criteria

Evaluation of Supplier Criteria

With this survey I am mapping the importance of different factors in suppliers.

State your name and area of responsibility

Name your top 3 most important suppliers

On a scale of 1-5, rate the following criteria related to suppliers and their activities based on their importance.

1= Not important 5= Really important

Price

1	2	3	4	5

Quality (overall quality of products and operations)

1	2	3	4	5

Location

1	2	3	4	5

Reliability (In example how well does the company stay in agreed schedule)

1	2	3	4	5

Capacity (How much and how fast can the company produce products)

1	2	3	4	5

Resources (Adequacy and competence of personnel and equipment)

1	2	3	4	5

Economy (Financial stability of the company)

1	2	3	4	5

Communications (Quickness, ease and clearness of communication)

1	2	3	4	5

Consistency (How consistent are company’s operations and product quality)

1	2	3	4	5

Sustainability (How ecological and sustainable values are executed)

1	2	3	4	5

Appendix 2. Evaluation of Supplier's Performance

Evaluation of Supplier's Performance

This survey is for mapping supplier's performance in different areas. Answer the questions, how you think the supplier has performed in the area in question. If you do not know or are unsure of the answer, leave the box blank. Fill all the sections and finally click submit.

Supplier X

On a scale of 1-5, rate the following criteria related to suppliers and their activities based on their importance.

Price

1= Expensive 5= Inexpensive

1	2	3	4	5

Quality (overall quality of products and operations)

1= Poor quality 5= Excellent quality

1	2	3	4	5

Location

1= Far away 5= Nearby

1	2	3	4	5

Reliability (In example how well does the company stay in agreed schedule)

1= Unreliable 5= Very reliable

1	2	3	4	5

Capacity (How much and how fast can the company produce products)

1= Weak capacity 5= Excellent capacity

1	2	3	4	5

Resources (Adequacy and competence of personnel and equipment)

1= Low resources 5= High resources

1	2	3	4	5

Economy (Financial stability of the company)

1= Weak economy 5= Strong economy

1	2	3	4	5

Communications (Quickness, ease and clearness of communication)

1= Hard to communicate 5= Easy to communicate

1	2	3	4	5

Consistency (How consistent are company's operations and product quality)

1= Inconsistent 5= Very consistent

1	2	3	4	5

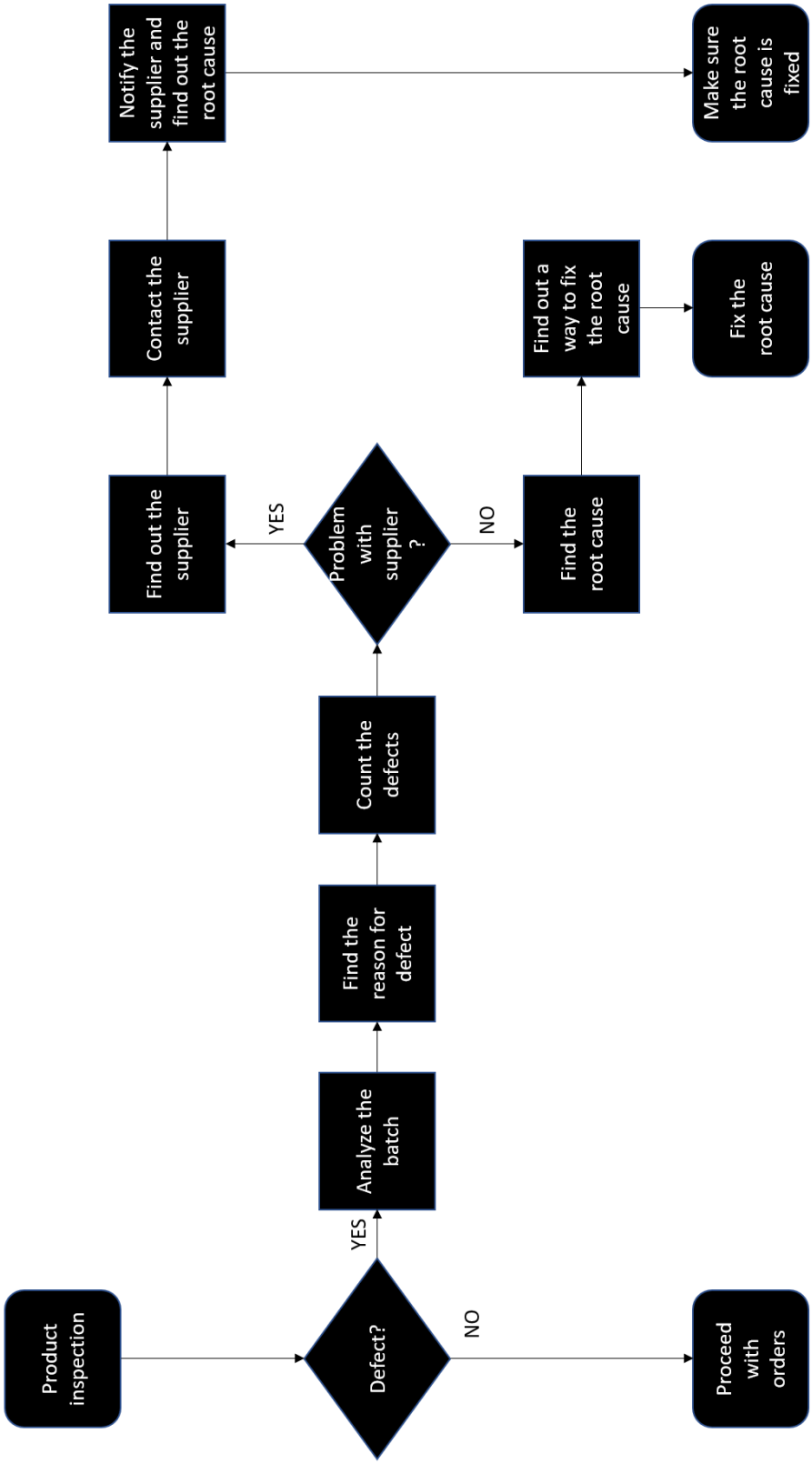
Sustainability (How ecological and sustainable values are executed)

1= Unsustainable 5= Very sustainable

1	2	3	4	5

These same questions were asked concerning every supplier named on the previous survey.

Appendix 3. Upgraded Workflow Analysis



Appendix 4. Semi-Structured interview of current state of sourcing and supplier evaluation

Semi-Structured interview of the current state of sourcing and supplier evaluation

- How do you keep a track on the volume of your orders?
- How does the current ERP-system in use work?
- What information is displayed there?
- What is listed under the orders in ERP?
- What kind of buffer do you have in your warehouse?
- How are different areas of production categorized and who oversees what?
- How is billing handled?
- Are orders registered automatically to ERP when they arrive?
- How is the production driven (push, pull etc.)?
- On what basis are suppliers usually selected?
- Does every operative buyer have suppliers that he/she oversees?
- What would you like to know about the performance of your suppliers?
- Would you like to keep a more precise track on money attached to orders?